The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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With this issue is published an Index to Volume XXIII of THE CHEMICAL AGE, *covering the period July 5 to December 27, 1930, inclusive.*

Scientific Apparatus

THE Physical and Optical Societies may be warmly congratulated on the success of their twenty-first annual exhibition of electrical, optical and other physical apparatus, arranged in two sections, one concerned with trade and the other with research and experiment, held in London this week. Almost every year since the exhibition was instituted has seen an extension of some kind, and in the year in which it attained its majority it is satisfactory to note the large number of exhibitors and the public interest that the exhibition attracted during the three days it was open. Not only in industrial operations but especially in research and experiment, instruments and apparatus of the most exact accuracy have steadily been coming into use with the most beneficial results. Research has been enormously helped by the aid of this new fine mechanism placed at the service of the worker, and it s good to see the large number of firms that now provide for this class of scientific work, and the large extent to which British products meet the needs of the laboratory. The exhibition of this year was so representative and genuinely educational that it almost seemed a pity to limit it to three days. The organisers, in any case, may look back with complete satisfaction on their effort.

Heat Transfer

THERE are all sorts of ways of producing heat. The coke brazier of the night-watchman at least looks attractive; the vendors of gas and electricity vie with one another in inventing new and ever more efficient methods of heating; there are boilers small and boilers large producing steam at normal, at high, or at super pressures; the types of furnace are as legion. Obviously the subject of heat transference is being fully and amply studied, and yet the specific demands both for economic and efficient conditions as well as for temperature control between narrow limits are so numerous that further progress, perhaps on novel lines, is an urgent desideratum.

Attempts are being made, for example, to evaporate liquids by submerged combustion, a mixture of gas and air burning in the liquid through which the hot products of combustion pass. Of another type are the efforts to use two liquids gasifying the higher boiling and causing that to vaporise the lower. Thus mercury heated by flue gases at 1200° F. is converted into a liquid boiling at 900° F. at 70 lbs. pressure, whereas water at the same temperature would have a vapour pressure of 3,000 lbs. Latterly two organic compounds have been found sufficiently stable to be heated to much higher temperatures than could be had with steam without enormous pressures resulting. These are diphenyl and its oxide, both by-products of the manufacture of synthetic phenol from chlorbenzene. Judging by what we hear of the experience already gained, these substances may prove of considerable value in cases of heat transfer where only a small gradient in temperature between the heating material and the substance heated is permissible.

More and more, as use is made of catalytic reactions in which for best results only a narrow variation of temperature is permissible, it becomes essential to have a practical means of realising such small temperature gradient. Electric heating for such purpose, though often applicable, is generally too costly, but it is apparently economical to store electrical energy during the period of the off-peak load as heat. Thus many modern houses produce hot water in this manner at night under thermostatic control and we read of power systems storing up heat during the night by electrically heating an insulated reservoir of oil to about 300°, the heat being used for process heating during the day.

On the Continent we believe it is the practice to pump water to a head during the off-peak period and use this head of water to generate electricity next day. As the original electricity was produced by water power and transmitted to a distance, extra power is available during the maximum load period and the full 24-hour duty is obtained from the water turbines. It is clear that heating problems are being attacked from a variety of novel viewpoints.

A Defence of Science

SIR RICHARD GREGORY's address to the annual Conference of Educational Associations on "The Worth of Science" was largely a defence of science—and a very good one, too, supported by many facts and illustrations—against the suspicion that science is a sort of destroying angel, delighting in sinister acts against mankind. The suspicion, of course, rests on a total failure to appreciate what science really is. In its "pure" form it is simply the acquisition of exact knowledge for its own sake, and the continual extension of the boundaries of existing knowledge. In that sense it is neither good nor bad—though it should not need much argument to convince people that it is better to be informed than uninformed. It is only when the new knowledge that the scientist gains comes to be applied in industry or in other fields that the question whether the results are good or bad begins to arise. These results are not really science, but only the effects of the application of scientific knowledge, and the applications may vary from the most humane and benevolent to the most sinister. In some curious way it is the latter applications that so many people mistakenly associate with science—and particularly with chemistry—and Sir Richard Gregory does a useful service in pointing out the many directions in which science has benefited mankind and enormously extended different fields of industry. Dr. Arthur D. Little, in a presidential address in Manchester some two years ago, similarly demonstrated in relation to industry that an invention that temporarily displaced labour almost always ended in the employment of greatly increased numbers.

Taxation, £14; Trade, £12

SIR ARTHUR BALFOUR, speaking at the salesmanship banquet at the Guildhall, when the Prince of Wales made an inspiring speech on the art of selling, brought out to the ringing applause of a thousand men the striking figures which head this paragraph. How is it possible, he asked, for the economic position of this country to be satisfactory when our taxation per head of the population actually exceeds the corresponding figure for export trade? The £14 of taxation to which Sir Arthur Balfour referred represents, of course, only the direct exactions of the Chancellor of the Exchequer, and if against our £12 of export trade were put the total figure of public burdens, local as well as national, the contrast would be still more impressive. In this single sentence Sir Arthur Balfour has made a most valuable contribution to the public discussion of economy, the growing evidence of which on all hands is the most hopeful of the signs of the times.

Books Received

REPORT OF THE WATER POLLUTION RESEARCH BOARD FOR THE YEAR ENDED JUNE 30, 1930. Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 33. 9d.

THE MINERAL INDUSTRY OF THE BRITISH EMPIRE AND FOREIGN COUNTRIES. Zinc. Second Edition (1920–1929). Imperial Institute. London: H.M. Stationery Office. Pp. 194. 3s.

TANTALUM AND NIOBIUM. The Mineral Industry of the British Empire and Foreign Countries. Imperial Institute. London: H.M. Stationery Office. Pp. 28. 6d.

WATER POLLUTION RESEARCH. Summary of Current Literature. Vol. IV, No. 1. January, 1931. Abstracts Nos. 1-138, London: H. M. Stationery Office. Pp. 36. 1s. 3d.

OFFICIAL DIRECTORY OF THE BRITISH CHEMICAL PLANT MANUFACTURERS' ASSOCIATION, 1931. London: The British Chemical Plant Manufacturers' Association. Pp. 152.

BRITISH CHEMICALS AND THEIR MANUFACTURERS, 1931. London: Association of British Chemical Manufacturers. Pp. 405.

OPTICAL ACTIVITY AND HIGH TEMPERATURE MEASUREMENTS. By F. M. Jaeger. London: McGraw-Hill Publishing Co., Ltd. Pp. 450. 20s.

The Calendar

Jan.		
12	Ceramic Society: "Clays as Minerals and as Colloids." C. E. Marshall. "Plastic Flow Measurements and their bearing on the Plasticity Problem." G. W. Scott-Blair. 7.30 p.m.	North Staffordshire Technical College, Stoke-on-Trent.
12	Institute of Metals (Scottish Section): "Chromium Plating." J. G. Roberts. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
13	Mineralogical Society. 5.30 p.m.	London.
13	Institute of Metals (N.E. Coast Section): "Copper-Silicon Alloys." W. B. Goudielock. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
13	Institution of Petroleum Technologists. 5.30 p.m.	Aldine House, Bedford Street, Strand, London.
13	Society of Chemical Industry (Birmingham and Midland Section): "Resins Derived from Urea and Thiourea." E. C. Rossiter. 6.45 p.m.	Chamber of Commerce Buildings, New Street, Birmingham.
14	Institute of Fuel: "The Continuous Production of Water Gas." Dr. Thau. 6 p.m.	Burlington House, Piccadilly, London.
15	Society of Dyers and Colourists (West Riding Section): "Latest Developments in the Application of Washing and Finishing Agents." Dr. J. Nusslein.	Bradford.
15	Chemical Society: 8 p.m.	Burlington House, Piccadilly, London.
15	Optical Society: 7.30 p.m.	Imperial College of Science and Technology, London.
15	Biochemical Society of the University of Birmingham: Presidential Address by Professor A. R. Ling.	University, Birmingham.
16	West Cumberland Society of Chemists and Engineers: Two Films: (1) "The Story of Beautiful Colours." (2) "A Visit to the Witton Works of I.C.I. Metals, Ltd., Birmingham." 7 p.m.	Workington.
16	Society of Chemical Industry (Newcastle Section): "The Use of Fused Silica in Science and Practice." Dr. Burrows Moore. 7.30 p.m.	Chemistry Theatre, Armstrong College, Newcastle-on-Tyne.
16	Physical Society: 5 p.m.	Imperial College of Science and Technology, South Kensington, London.
16	Society of Chemical Industry (Liverpool Section): Hurter Memorial Lecture, "Organic Syntheses Facilitated by Pressure." Professor G. T. Morgan. 6 p.m.	University, Liverpool.
16	Society of Dyers and Colourists (London Section): "Researches upon the Laundering of Fabrics." J. T. Holden.	London.

Anhydrite in Ammonium Sulphate Manufacture

By P. Parrish, A.I.C., M.I.Chem.E., M.I.Gas.E.

The following account of the use of anhydrite (calcium sulphate) in the production of ammonium sulphate is taken from a contribution by Mr. Parrish before the World Power Conference, 1928, which has just been reprinted with some later observations in the Report of the Ammonia Sub-Committee of the Institution of Gas Engineers.

STATEMENTS have appeared from time to time to the effect that the by-product ammonia problem may possibly be solved by resorting to the use of anhydrite in lieu of sulphuric acid in the manufacture of sulphate of ammonia. Such statements should not be accepted implicitly. Indeed, the whole position should be examined scrupulously. The number of unit processes involved in the utilisation of anhydrite in the manufacture of ammonium sulphate is not generally realised. Neither is the importance of large-scale operations, nor the economics of the process, fully appreciated.

In order to obviate any misconception concerning the anhydrite process it is important to examine three pertinent questions :—

1. In what form must by-product ammonia be recovered to admit of the application of the anhydrite process ? 2. What are the unit processes involved in the production of ammonium sulphate from anhydrite ? and 3. How does the cost of anhydrite, taking the extra-unit processes involved into consideration, compare with the price of sulphuric acid ?

1. By-product ammonia would need to be recovered as gas liquor, and by a simple distillation could be converted to concentrated gas liquor—a form in which it would be suitable for the application of the anhydrite process. Concentrated gas liquor contains about 15 per cent. of ammonia (it should not contain more, otherwise difficulty may arise through crystallisation), usually as carbonates and sulphides of ammonium.

2. The unit processes are as follows : (*a*) recovery of by-product ammonia gas liquor ; (*b*) distillation of gas liquor in the production of concentrated gas liquor ; (*c*) recovery and purification of flue gases as a source of CO_2 ; (*d*) carbonatation of the ammonium sulphides of the concentrated gas liquor ; (*e*) recovery of the H_2S released in the carbonatation process ; (*f*) grinding and screening of anhydrite to a suitable size ; (*g*) interaction of ammonium carbonate with calcium sulphate in a series of suitable vessels ; (*h*) filtration of ammonium sulphate-calcium carbonate magma ; (*i*) evaporation of ammonium sulphate solution and its subsequent crystallisation, centrifuging, and drying ; and (*j*) removal and treatment of calcium carbonate sludge.

It will be well to supplement the foregoing information by one or two brief notes concerning the technique of the anhydrite process.

Grinding of Anhydrite

Calcium sulphate is found in this country in three forms, (*a*) as gypsum, $CaSO_4 2H_2O$; as hemi-hydrate, $2CaSO_4 H_2O$; and (*c*) as anhydrite, a typical analysis of which is given below :

$CaSO_4$	89·9 per cent.
Uncombined water	9·8 ,,
SiO_2	0·15 ,,

Anhydrite is frequently supplied in large pieces, sometimes weighing 1½ cwt. each. It must, therefore, be ground.

The roll jaw crusher for a plant capable of producing 3 tons per hour of anhydrite, reduced to such a size that not more than 2 per cent. of tailings remain on a 100 by 100 mesh screen, will involve an estimated capital expenditure of £3,500, of which £600 is for a building for housing the plant. Basing on 10 per cent. for depreciation and 5 per cent. for interest on capital, the cost of grinding and screening will be 4s. per ton—a charge which cannot be ignored. It should not be overlooked that the speed of reaction between ammonium carbonate and calcium sulphate is influenced by the particle size of the anhydrite.

The reaction between anhydrite, concentrated gas liquor and flue gases containing carbon dioxide is effected in a special reaction vessel provided with a stirrer and cooling coils. The vessel should also be jacketed, to aid cooling. The anhydrite should be introduced to the vessel, and the concentrated gas liquor and some wash water from a previous operation should be added. Flue gases containing carbon dioxide can now be introduced, and their passage continued until the whole of the sulphides in the concentrated gas liquor have been decomposed.

As ammonia and hydrogen sulphate will escape the first reaction vessel during the time that the flue gases are introduced, it is necessary to provide a number of these vessels. These should be so arranged that they can be operated either by forward or backward rotation, thus admitting of any vessel being put out of action to allow of its discharge and recharging. Under certain conditions of operation it has been found that a 20 per cent. ammonium sulphate solution is the highest concentration to which one can work satisfactorily without interference from precipitated calcium carbonate.

In this connection it may be advisable to leave 2 or 3 per cent. of unconverted calcium sulphate rather than involve a second or third filtration. One of the advantages of the use of concentrated gas liquor is that about 80 per cent. of the ammonia exists as carbonates of ammonia. But flue gases containing CO_2 must be used to convert the remaining 20 per cent. of the ammonia, existing usually in the form of sulphides, to carbonates.

Treatment of Flue Gases

How the flue gases should be treated so as to be rendered suitable for application to the process is a matter that needs careful consideration. Flue gases are usually available, but if these result from the combustion of coke, they may contain from 40 to 100 grains of SO_2 per 100 c. ft., in addition to which there will be entrained dust and grit. The question arises at once : Can flue gases be used direct or must they be purified ? Flue gases may have a varying temperature of from 200° to 600° C., according to their origin. If the CO_2 in the gases is to be of service for a carbonatation process such as that contemplated, it will be necessary to introduce them to the plant at a temperature not exceeding 20° C.

From a knowledge of the use of the carbon dioxide content of flue gases for other purposes, the necessity for cooling becomes evident. If the flue gases were merely passed through condensers to attain the necessary reduction of temperature, difficulty would arise through corrosion, due to the formation of a weak solution of sulphurous and sulphuric acids. The best method to adopt is to pass the flue gases through a packed tower, down which sufficient water is run to cool the gases to 20° C. Operating in this way, the SO_2 would be almost wholly absorbed, and the grit and dust would be arrested.

From the point of view of suitable plant it should be emphasised that if corrosion is to be avoided the flue gases must be fed to the packed tower at a temperature preferably above dew-point (which may be of the order of 150° to 180° C.) ; that the tower must be lined with acid and heat-resisting tiles, packed with acid and heat-resisting rings, and generally constructed of such materials as will be found to resist the attack of weak solutions of sulphurous and sulphuric acids. The pipes and suction fan after the packed tower could be of cast iron.

The agglomeration of large nodules and crusts of precipitated calcium carbonate is a frequent cause of unsatisfactory filtration. Where vessels of a certain minimum capacity are employed, this difficulty can be minimised. At some works it has been so acute as to lead to alternative methods of treatment being suggested. One such method is that devised by the firm of Otto and Co., where a special reaction column is used, the vertical axis of which consists of a mechanical rotating shaft carrying at equi-distant intervals cone-shaped collars, projecting in a downward direction.

Method of Filtration

The separation of the ammonium sulphate from the calcium carbonate calls for special comment. Some qualities of anhydrite contain argillaceous matter, and the separation of the colloidal suspension of calcium carbonate from ammonium sulphate solution produced in the reaction has constituted a very difficult problem. All the usual types of filtering plant have proved unsatisfactory, by reasons of the large amount of wash water required to free the precipitate from the bulk of its ammonium sulphate. The solutions obtained are so dilute

that the cost of evaporating is prohibitive. The adoption of suction filters completely immersed in the liquors has been responsible for the solution of the difficulty. These filters are immersed in the reaction mass, and a vacuum is applied to their interior. The precipitate deposits in a uniform layer on the outside of the filters, and the clear filtrate passes through. A simple form of this type of filter consists of a wooden frame, two sides of which are provided with filter cloth, the wooden sides themselves being perforated. One or more tubes crossing the frame on its narrow side are used for applying the suction on the inside of the filter.

When the deposit of calcium carbonate is thick enough, the whole filter is immersed in fresh water, either by removing it from the reaction vessel or by discharging the latter and then refilling with water. The washing of the uniform deposit on the filter can be effected easily, and the amount of water used is comparatively small. After washing, the cake of calcium carbonate is readily detached from the filter, either by blowing compressed air through the filter from the inside, or by flushing from the inside with water under pressure. The principle underlying the method of filtration is not new, but is only applicable to precipitates depositing in a coherent layer, at the same time being such as to be cellular in structure and readily permeable by water without channelling and without becoming detached.

Where the anhydrite contains undue quantities of argillaceous impurities, it is usually preferable to submit the material to a preliminary calcination at 300° C. in rotary furnaces of the cement type. This, of course, introduces another source of expense, which must be taken into consideration when contrasting the price of anhydrite with that of sulphuric acid.

Evaporation

The evaporation of the resulting ammonium sulphate solution has not been altogether immune from problems. At first sight it may be imagined that it would not be difficult to secure a neutral or alkaline solution of ammonium sulphate. This is perfectly true. But an alkaline solution of ammonium sulphate is not without corrosive properties, and may prove to be, under certain conditions, as troublesome as an acid solution of sulphate of ammonia, particularly if the final colour of the ammonium sulphate is regarded as one of importance. It is known that trials have been made with many materials, such as cast iron, Staybrite, and stainless steel, etc. No one who has had any experience of the use of these materials can reach any other conclusion than that there is much merit in a homogeneously lead-lined steel evaporator.

Enough has been said to make it clear that the utilisation of anhydrite in lieu of sulphuric acid for the manufacture of ammonium sulphate is not nearly so simple a process as many are inclined to suppose. Many unit processes are involved; additional chemical supervision is necessary, and the efficiency of the conversion of the calcium sulphate content of the anhydrite to ammonium sulphate, the efficiency of the use of the CO_2 content of flue gases and of ammonia in the interaction, must be carefully considered.

It is known that both ammonia and calcium sulphate are lost in the calcium carbonate cake, and it is important that these losses should be maintained at a minimum. Apart from the foregoing, one is aware that under the best conditions 60 tons of water has to be evaporated in the production of every 40 tons of ammonium sulphate. In other words, 1½ tons of water have to be evaporated per ton of sulphate of ammonia manufactured. Against this disadvantage, no steam is required for the distillation of the concentrated gas liquor, such as would be involved if concentrated gas liquor were to be distilled and used in conjunction with sulphuric acid in the manufacture of ammonium sulphate.

Without attempting to enter into detailed calculations, it will be assumed that the one advantage offsets the other disadvantage. Regarding the matter from the point of view of chemical plant, it is clear that a good deal more apparatus is required in connection with the anhydrite process than with that involving the use of sulphuric acid. The anhydrite process involves crushing, grinding, and screening plant; reaction vessels with agitators and suitable drives for the interaction; purification plant for the flue gases containing CO_2; special filters, together with vacuum producing plant for the separation of the calcium carbonate sludge from the ammonium sulphate solution, and rotary dryers for the treatment of the calcium carbonate sludge.

Where concentrated gas liquor is used, and sulphuric acid is the source of the SO_4 ion in the manufacture of ammonium sulphate, a gas liquor still with heat interchangers and coolers, and a saturator and equipment, are the only plant involved.

3. Coming now to the cost of anhydrite, having regard to the unit processes involved, in contrast with the price of sulphuric acid. It is known that anhydrite containing (say) 90 per cent. of calcium sulphate can be obtained in the neighbourhood of the mines at 12s. 6d. per ton, but delivered London or the equivalent it will cost 25s. per ton. How far the anhydrite process is likely to prove advantageous depends largely on the geographical situation of the ammonia works in relation to the anhydrite mines. The following estimates will doubtless prove interesting, representing, as they do, a pecuniary comparison of anhydrite, as contrasted with the price of sulphuric acid.

Estimate based per ton of ammonium sulphate manufactured, containing 25·5 per cent. NH_3.

	£	s.	d.
(*a*) 24 cwt. of anhydrite at 12s. 6d. per ton at mines, *plus* 2s. 6d. per ton carriage = 15s. per ton	0	18	0
(*b*) Grinding of 24 cwt. of anhydrite at 4s. per ton	0	4	10
(*c*) Extra cost for power and labour for filtration and handling the calcium carbonate sludge	0	5	0
(*d*) Interest at 5 per cent. and depreciation at 7½ per cent. on extra capital cost of plant (say)	0	4	0
(*e*) Extra chemical supervision	0	3	6
(*f*) Cost of treatment of flue gases for carbonatation process	0	2	6
(*g*) Water for cooling and washing precipitated calcium carbonate cake and filter cloths, etc.	0	2	6
	£2	0	4

Against the above, where sulphuric acid is used, one has the following charge :—

	£	s.	d.
1·11 tons of 70 per cent. acid at (say) 55s. per ton	3	1	0
Difference in favour of the anhydrite process, per ton of ammonium sulphate manufactured	1	0	8

When the anhydrite is delivered London, there is still a difference of 8s. 8d. in its favour over sulphuric acid.

It is obvious, therefore, that the anhydrite process as an alternative to the use of sulphuric acid needs to be carefully considered. The nature of the process, however, necessitates a medium-sized scale of operations, and it is the writer's view that plant to deal with *less* than 30 to 40 tons of ammonium sulphate per day would not be warranted.

Only one further comment is called for. Where the centrally situated chemical works is sufficiently large, it would, perhaps, be advisable to consider a process which involved the manufacture of diammonium phosphate and calcium nitrate from (*a*) concentrated gas liquor; (*b*) ground phosphate rock treated with sulphuric acid in the manufacture of phosphoric acid; and (*c*) the utilisation of the precipitated calcium sulphate (which is really in a better form physically than anhydrite), in the production of ammonium sulphate.

Incidentally, the calcium carbonate produced from the latter process could be treated with nitric acid obtained by the oxidation of ammonia (Ostwald process), to yield calcium nitrate and release carbon dioxide for the carbonatation process. One such cyclic process, possessing distinctive features, has been suggested by Dorr-Liljenroth, and it is certain that more will be heard of the process in the near future. As far as one can ascertain from a consideration of railway rates and other related data, the radius covered by any centrally situated chemical works treating concentrated gas liquor or ammonium sulphate solution should not be more than forty miles.

Results of Later Trials

Since the above contribution, opportunity has offered to investigate certain aspects of the production of ammonium sulphate from calcium sulphate. It was originally thought that one series of vessels might serve for carbonatating the concentrated gas liquor and securing successive but immediate interaction of the nascent carbonates of ammonia with calcium sulphate. Trials conducted on a semi-technical scale revealed that this was not altogether a desirable procedure. While ammonium sulphate could be obtained of satisfactory concentration, it was found that ammonium polysulphide remained at the end of the process to the extent of 1·5 to 2 per cent., and

that neutralisation of the filtered ammonium sulphate solution led not only to the evolution of hydrogen sulphide, but to the precipitation of free sulphur in a fine form, which rendered filtration necessary. From several viewpoints it is eminently desirable to carbonatate in a separate vessel, specially designed for the purpose. Not only is there economy of plant, but equally, economy of time, because carbonatation and interaction can proceed simultaneously in separate suitable vessels, and in both cases provision can be made for obtaining optimum conditions for mass reaction.

Also in the original contribution it was suggested that under certain conditions of operation a 20 per cent. ammonium sulphate solution was the highest concentration obtainable without interference from calcium carbonate. Subsequent repeated trials have disclosed that there is no difficulty in obtaining concentrations of ammonium sulphate of 40 per cent. given anhydrite of suitable chemical composition and physical characteristics. This is about the highest concentration that can be obtained short of crystallisation.

That the production of ammonium sulphate from anhydrite may be regarded as a conventional chemical works operation is abundantly confirmed by the trials which have been conducted since the original contribution was made. Indeed, subsequent investigation has revealed that in certain respects the process can be simplified, that a higher concentration of ammonium sulphate solution, up to 40 per cent., is possible, that filtration difficulties are not likely to arise with the Gotham quality of anhydrite, and these advantages must inevitably be reflected in reduced operating costs, below what were originally foreshadowed.

Annual Exhibition of Physical and Optical Societies

Co-operation of Scientist and Instrument Maker

Some of the latest advances in the production of scientific instruments were demonstrated at the twenty-first annual exhibition of the Physical Society and the Optical Society, which was opened on Tuesday by Professor Sir Arthur Eddington at the Imperial College of Science and Technology, South Kensington.

OVER eighty firms had trade exhibits at the 21st annual exhibition of the Physical Society and Optical Society which was opened on Tuesday afternoon and attracted a large number of scientific and other visitors. A very interesting section, with twenty-one exhibitors, was devoted to recent physical research and included displays by the National Physical Laboratory, the research laboratories of the General Electric Co., Ltd., the Gramophone Co., Ltd., the Wool Industries Research Association, the Gas Light and Coke Co. (Research and Training Section), the Rothamsted Experimental Station and the Post Office Engineering Research Station. A recent addition to the exhibition is a section designed to encourage craftsmanship in the scientific instrument trade, and to enable apprentices and learners under 21 years of age to exhibit in competition for prizes. There were over 70 entrants in this section and some highly commendable work was on view. Throughout the exhibition there were lectures and instructional experiments in physics by leading authorities.

Professor Eddington's Address

In his opening address Professor Sir Arthur Eddington referred to the steady growth of the exhibition since 1905 and the increase in the number of firms represented. The exhibition, he said, showed the dependence upon each other of the instrument maker and the scientific worker. Scientists were very interested in seeing the results of the work of the instrument makers, who generally professed to be unscientific. They would say, " We don't really calculate out these curves and dimensions ; we go on by trial and error until it comes right." This did not shock Professor Eddington, who was of opinion that " trial and error " could be as scientific as any other method. The scientific worker helped the instrument maker by stimulating the satisfaction of new requirements.

Professor Eddington commented on the history of the telescope and the progress in the design of this instrument, due chiefly to the discovery of achromatic object glasses in 1733 and the development of reflecting telescopes. Great hopes for further development were centred on the projected 200 inch reflector which the Carnegie Institution had decided upon.

" Yet it is interesting to reflect," he added, " that just the same results might come about by one of those simple, almost accidental, discoveries in the research laboratory. I suppose that, whether by further insight into the theory of photochemical action or by systematic scientific procedure, we can produce a photographic plate four times as sensitive as those at present in astronomical use that would effectively turn the present 100 in. into a 200 in., and at one stroke bring within reach all that is expected from the great new telescope."

This progress, however, had made the scientific worker dependent on highly complex and expensive instruments, which, once acquired, had to be used to the utmost. The days were past when one could put together in the workshop some " tintacks and sealing-wax " and then set to work and discover something. The exhibition showed the latest appliances with which the scientific workers could equip themselves for further advance to wrest the secrets from the electron, the atom and the stars. He compared it with a modern magic cave and declared it open with the magic words, " Open Sesame."

A vote of thanks to Sir Arthur Eddington was proposed by Sir Frank Smith, Secretary of the Department of Scientific and Industrial Research, who stressed the absolute dependence of modern research on the work of the scientific instrument maker. Mr. H. T. Tizard, F.R.S., Rector of the Imperial College of Science, seconded the vote and added a tribute to the matchless skill of the British workmen engaged in the industry. Accompanied by a group of scientists Sir Arthur afterwards made a tour of the stands in the exhibition and witnessed the various demonstrations.

The National Physical Laboratory

Of the fifteen exhibits of the National Physical Laboratory perhaps the greatest interest was aroused by the demonstration of two novel methods for the inspection of the airflow pattern round models. The first was an improvement on the customary method of introducing smoke or vapour into the air stream, either through holes in the model, or by means of a tube held some distance upstream. Apart from the limited choice of smokes possessing the requisite degree of opaqueness, it is difficult to inject smoke without causing interference with the flow. This difficulty is overcome by the use of titanium tetrachloride as the agent for producing smoke. It is found that the chemical action between the moisture in the air and a few drops of this liquid spread over the surface of a model generates clouds of white vapour, sufficient to render visible the details of the flow pattern. The method was demonstrated with the aid of a small wind tunnel. In the second method the stream lines were made visible by means of a hot wire instrument. This consists of a grid of fine platinum wires which are heated electrically and mounted in the wind tunnel, As the air flows past them, each wire leaves a thin wake of hot air behind it. An arc lamp shining through the glass walls of the tunnel casts shadows of these hot air bands on a screen. When a body of any shape is placed in the stream the hot bands follow the direction of the airflow past it and a shadowgraph of the body and the flow pattern round it can be traced or photographed.

Other outstanding exhibits of the National Physical Laboratory were the apparatus used in the realisation of the International Scale of Temperature ; a sonometer for the measurement of telephonic frequencies between 100 and 10,000 cycles per second ; and apparatus from the wireless division of the Laboratory illustrating work carried out for the Radio Research Board of the Department of Scientific and Industrial Research. Examples of single crystals of aluminium, iron, zinc, antimony, silver and bismuth which had been fractured under various types of applied strain, illustrated the general characteristics of the deformation of single crystals of metals with particular reference to twinning. A working

model showed the probable atomic movements occurring during twinning.

Various types of discharge tubes and the phenomena connected with them were demonstrated by the research laboratories of the General Electric Co., Ltd. Low voltage hot cathode discharge tubes (including the sodium vapour lamp) were shown operating direct from an ordinary A.C. supply and other demonstrations included the mixing of coloured light for hot cathode tubes to produce various types of illumination, and of the "animated" or "ripple" type of discharge in which the narrow very luminous glow instead of remaining stationary along the axis of the tube wavers about. The flow of glass in a melting tank was illustrated by a block of glass from a tank supplying glass to an automatic bulb blowing machine. The direction of flow was obtained by introducing blue colouring matter (cobalt oxide) into the clear glass at its entry into the tank. As soon as the blue glass appeared at the machines the tank was cooled and the glass chipped out. The block showed a portion of the glass stream diverted upwards due to convection. The improvement which has been made in the development of heat resisting alloys of the nickel chromium type by melting in hydrogen was illustrated by the exhibition in this section of alloys containing 80 per cent. nickel, 20 per cent. chromium, which have been melted in hydrogen for various periods and allowed to solidify in the crucible.

Gas, Light and Coke Co.

Exhibits from the Gas Light and Coke Co. included methods of protecting pipes from corrosion, apparatus for determining the effect of water velocity, temperature and surfaces on the deposition of scale, apparatus for measuring rubber permeability, enamel tests and a wet and dry bulb hygrometer for determining the dew point of coal gas. Many defects in the usual form of this type of hygrometer are eliminated and laborious calculations are simplified by means of a slide rule, designed to give direct readings of the dew point.

Wool Research

The Wool Industries Research Association showed a simple form of transmission dynamometer, designed to measure the power absorbed by various types of spinning frames, a new microbalance, the Burton-Pitt moisture tester for measuring the regain of various types of wool and an abrasion tester for cloth. The last mentioned is an adaptation of the Deeley friction machine for measuring the lubrication of oils, as supplied by J. H. Steward, Ltd. It has been modified to allow the measurement of the friction between two cloth surfaces under varying pressures when the rubbing is either (*a*) along the warp, (*b*) along the weft, or (*c*) warp against weft. A recording drum has been fitted to allow continuous measurement of the friction so that the operation of rubbing can be continued until the cloth is completely disintegrated.

Other exhibitors in the research and experimental section besides those mentioned, included the British Thomson-Houston Co., Ltd., the Research Institute of the Cancer Hospital, Supra Electra Motors, Professor G. B. Bryan, Professor J. K. Catterson-Smith, Mr. A. M. Codd, Mr. R. W. Corkling, Dr. W. H. George, Professor E. P. Harrison, Mr. F. Hope-Jones, Dr. D. Jack, Mr. B. K. Johnson, Professor A. F. C. Pollard, and Captain R. G. Wilson.

Trade Exhibits

Among the trade exhibitors a prominent place was taken by electrical and wireless firms, whose displays gave proof of the vast amount of research which they carry out, together with the adaptation of the fruits of research to the demands of industry. Space will not permit of a detailed notice of these firms, but several had considerable interest for the chemist.

Microscopes naturally figured prominently on many of the stands, including those of Charles Baker, R. and J. Beck, Ltd., the Emil Busch Optical Co., Ltd., Adam Hilger, Ltd., E. Leitz (London), Griffin and Tatlock, Ltd., the London Instrument Co., Ltd., Newton and Co., James Swift and Son, Ltd., W. Watson and Sons, Ltd., and Carl Zeiss (London), Ltd. Very fine metallurgical microscopes were shown in the Beck, Griffin and Tatlock, and Leitz displays, and their demonstration aroused considerable interest. Spectrographs took an important place on the Adam Hilger stand, together with other specialised apparatus this firm has developed. Optical projection apparatus as well as radium apparatus, and pumps for high vacuum technique were displayed by W. Edwards and Co.

Some New Apparatus

Important apparatus, with engineering and industrial chemical application, was shown by Kelvin, Bottomley and Baird, Ltd., whose new exhibits included Pneumercator distant reading boiler water level gauge, a distant specific gravity gauge and an infra-red radiation lamp. A good variety of new measuring and controlling apparatus was shown by Negretti and Zambra, and also by the Drayton Regulator and Instrument Co., Ltd., Middlesex, and Crompton Parkinson, Ltd.

New apparatus exhibited by the famous firm of W. and T. Avery, Ltd., included a liquid specific gravity balance and a saturation tester, designed, in the first place, for the malting industry. Chemical balances and weights were among the beautifully finished and highly sensitive instruments shown by L. Oertling, Ltd. An introscope for the detailed examination of the interior surfaces in tubes, bores, and other enclosed spaces and a milliammeter, incorporating the "Resilia" spring mounting of the moving system were among the newcomers in the display of the Foster Instrument Co. Apparatus for geophysical surveying and a new hydrogen-ion recording outfit were on the stands of the Cambridge Instrument Co., Ltd.

Wild-Barfield Electric Furnaces, Ltd., showed and demonstrated a Vickers Pyramid hardness testing machine, and another stand of metallurgical importance was that of F. J. Witts and Co., where wire drawing dies and fine wires, tapes and gauges were on view. Electric furnaces and electrically-heated ovens were among other units shown by A. Gallenkamp and Co., Ltd. New chemical and coal and oil and tar testing instruments were exhibited by Baird and Tatlock (London), Ltd., and chemical interest also attached to the display by The Tintometer, Ltd., of Lovibond tintometers for registering the colour of all substances.

Glass Firms

Chance Brothers and Co., Ltd., of Smethwick, in an exhibit similar to that of last year showed a rough lump of very heavy lead glass, refractive index about 1·8, of unusually high standard for light transmission. Curves and transmission data were given for this block, and for other types of optical glass. Another scientific glass firm which has played an important part in the development of the instrument industry, Parsons Optical Glass Co., Little Chester, Derby, displayed large pieces of optical glass, lens, mouldings of various shapes and diameters, from 14 mm. to 140 mm., and samples of discs for telescope and mirrors.

Bakelite, Ltd., had a very comprehensive display of synthetic resin products, including varnishes, moulding materials, cements and lacquers as well as finished products for a large number of industries. Mouldings in Bakelite and other synthetics also appeared on the stand of Ebonestos Insulators, Ltd.

The Exhibition remained open for three days and on Thursday, when the public were admitted without ticket, a lecture was delivered by Professor Sir Gilbert Walker on "Physics of Sport." On Wednesday evening "Searching for Minerals with Scientific Instruments" was the subject of a lecture by Mr. E. Lancaster Jones.

Pedler Research Scholarship

THE Council of the Institute of Chemistry has decided to proceed with the appointment of a second Pedler Research Scholar and invites applications from Fellows and Associates who are willing to work on one of the following problems :—(*a*) The accurate determination of very small quantities of the alkaline earth metals, under varying conditions. (*b*) The study of the sterols of natural fats, with a view to their quantitative separation and diagnostic value. (*c*) The study of the acids and esters of fruits, with a view to their differentiation and determination. (*d*) The study of reactions in emulsions; *e.g.*, the mechanism of the saponification of oils and fats by aqueous alkali, or allied subject.

The Council will also consider any problem suggested by a candidate himself, provided its solution is needed in the public interest. Applications should be sent in not later than Monday, February 2.

Planning a New Chemistry Building

Principles Adopted at Sydney Technical College

The following account of the new chemistry building of Sydney Technical College has been written by Dr. Ing. Robert K. Murphy, head of the Science Department of the College, who was also responsible for planning the building. It is taken from the Australian "Chemical Engineering and Mining Review" and contains some interesting principles of laboratory layout.

THERE was an urgent necessity for a new chemistry building at the Sydney Technical College for a number of years, due to the greatly increased enrolment and the requirements of the chemical industries of the State for adequately trained men in various branches of applied science, especially industrial chemistry and chemical engineering.

FRONT VIEW OF NEW CHEMISTRY BUILDING AT SYDNEY TECHNICAL COLLEGE.

The total enrolment in chemistry is now over three times what it was in 1915, and the service rendered to the industries of the State, as exemplified by the prominent positions attained by many graduates, more than justifies the expenditure of the £34,000 in the erection of the new chemistry building, which was approved in 1926, and was formally opened by the Hon. D. H. Drummond, Minister for Education, on July 4, 1930. The building is 170 ft. long by 60 ft. wide by 70 ft. high. It is of five floors, and of brick; concrete for the ground floor and stairs; wood for the other floors, covered with three layers of Malthoid for the laboratories and roof, which is flat for recreation purposes. There is approximately 18 ft. head room for the ground floor and 13 ft. for the others.

Lighting

A large amount of light and ventilation is obtained from the large windows, 8 ft. square and divided into nine small windows, each of which opens out, and is reversible, for easy cleaning. The upper section may be opened for cross ventilation purposes without blowing the bunsen burners, which is a great advantage.

The photo-microscopy laboratory and dark-room have black walls and ruby glass windows. There are 10 light points for microscope work, and the dark-room has a triple and a single developing lamp for the two large sinks and lead-covered draining table, and also two printing points. There are a number of electrical points in advanced laboratories which may be used for special light-points or electrical apparatus; and each of the seven benches in the biology laboratory have three adjustable light points made by the college staff from cut-down gas brackets. By using a half-shade, this gives a cheap and satisfactory microscope light with universal movement, that may be used by one or two people and with full protection to all students from glare. Each lecture demonstration bench is fitted with special light-points, and each lecture room has a point for lantern slide or film projection.

Ventilation

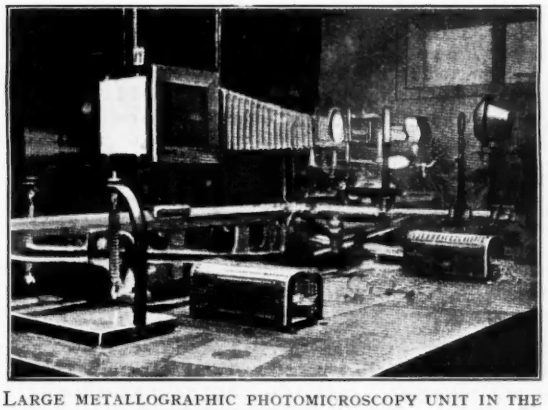
The ventilation of a chemistry building is so important and so seldom satisfactorily solved that the author gave special attention to this problem and discussed various aspects with Mr. Smart, supervising architect, and Mr. G. Vincent, ventilation engineer. The building has excellent natural ventilation because of its lay-out, its wide corridors, which are as short as possible, and the large number of adjustable windows. The main laboratories have unimpeded light and ventilation on three sides.

A separate fume chamber room adjoins both the qualitative and the quantitative laboratories. Each fume-chamber room is approximately 12 ft. wide by 22 ft. long, and contains two fume chambers 15 ft. in length and fitted with water, gas and electrical hot-plates. These fume chambers have slate tops, and as much glass as possible. They are well lit, and are connected to brick ventilating flues which are exhausted by a bitumen-covered copper, electrically-driven fan on the roof which pulls 5,000 c. ft. of air per minute. There are also three other similar fans connected to the brick ventilating flues in the other corners of the large laboratories, to which flues smaller supplementary fume chambers for acid evaporations etc., are connected. Hydrogen sulphide is supplied only in the large fume chambers in the fume chamber rooms. In this way it is intended to prevent the building from attaining that familiar, if undesirable, odour so well known to all chemists, giving a healthier and more pleasant place to work in.

At the other end of the building there are also four vertical brick ventilating flues with appropriate horizontal ducts. One of these is reserved for the fire-assaying laboratory, having a stack over 70 ft. high. The other three stacks are for general ventilation purposes and are exhausted by fans of 3,000 c. ft. per min. capacity. There is a central control for the seven fans in the staff office on the third floor.

Drainage

It is almost impossible to evolve a thoroughly satisfactory drainage scheme for a large chemistry building that is not excessively expensive. In order to prevent the usual trouble with either flat or round drains and traps, due to filter papers, broken glass, corks, precipitates, etc., experiments were made with a "catch-all" trap. The object of this trap is to remove the trouble at the source, and so far has proved most effective. Each sink has a 2-in. lead pipe discharging directly into the movable "catch-all" resting on the floor below, which is approximately 10 in. diameter by 10 in. high, and has a 2 in. overflow outlet near the top, discharging into a lead funnel which is connected directly to an earthenware drain pipe. In the final design of the "catch-all" an inner lip was added to prevent corks, etc., from floating out, thus converting the "catch-all" into a trap. It is made of well-fired white pottery, white glazed.



LARGE METALLOGRAPHIC PHOTOMICROSCOPY UNIT IN THE PHOTOMICROSCOPY LABORATORY.

The earthenware floor drains should be of vitreous white tile. For the sake of economy an ordinary brown glazed earthenware pipe was used. These are supported in wooden troughs between the joists lined with waterproof paper, a

thin layer of cement, and after joining and aligning the run, hot bitumen is poured over and under the full length of the run, taking particular care to cover all joints completely.

Cement should not be used to joint the pipes as it is not acid-resistant and is inclined to cause hair-line cracks, if the collars are at all weak, which may later develop into serious and expensive leaks. It is better to use a little asbestos rope and then one of the best quality sulphur-bitumen mixtures. No traps should be placed in floor-runs, but only at the end, or, better still, only at the bottom of the vertical drains.

For the sake of quick inspection and ease of alteration, all drain pipes, water, gas and electrical pipes are visible, painted white, and supported from the walls or ceiling, except, of course, for island benches, in which case the troughs referred to are used. There are 14 vertical earthenware drain pipes which connect to the two long horizontal runs under the ground floor. At both ends of these horizontal runs are accessible pits which permit of easy cleaning if it should ever be required. It is obvious that acids, etc., become highly diluted in the glazed pots before entering the drains. The use of Duriron or other alloy pipes was rejected on the ground of expense.

Plumbing

In order to provide an adequate water supply to all parts of the building, two 2-in. lines were run up from the high pressure mains—one at each end of the building, and cross connected at the top floor. Each floor has a separate cut-off valve, and in addition each large laboratory bench has a control valve for water and for gas. In this way, any part of the building may be isolated for repairs or alterations without interfering with the work in other parts. Gas and water pipes are carried in a 6-in. wide space between the carcases of the large benches.

Lay-out of the Building

The ground floor provides accommodation for applied science and heavy equipment, *i.e.*, industrial chemistry chemical engineering, control laboratory, low temperature laboratory, workshop, electro-chemistry, metallurgy, fire assaying, ceramics, crushing and grinding machinery, industrial research laboratory, and a bulk supply room. The first floor contains the administrative offices, chemistry library, students' study, factory models and specimens room, chemical and metallurgical drawing office, physical chemistry, and photomicroscopy laboratores, and two research laboratories; also lecture rooms and teachers' offices.

The second floor is devoted to general and inorganic chemistry, including commercial qualitative analysis. The main laboratory is approximately 50 ft. by 60 ft. and has eight large benches and four wall-benches, giving a total lockeraccommodation for 215 students. There is already a waiting list for places in this laboratory. All benches of this kind are 2 ft. 11 in high and have only a low one-shelf reagent rack which greatly assists ventilation and supervision of the laboratory. There is also a lecture room with 45 individual seats with fixed notebook rest. These seats have proved comfortable and satisfactory, and were made in the Government workshops to a design submitted by the writer as a result of several trials.

The main lecture theatre is on this floor and seats 200, barely large enough for the present first year chemistry class. The lecture demonstration bench is 31 ft. long, and the design of this and the blackboards, with folding flaps, received careful attention. The glass pneumatic trough is set up and out 4 in., making it clearly visible from all parts of the room.

The third floor is chiefly devoted to quantitative analysis, the laboratory for which is of the same size and somewhat similar furnishing to the qualitative laboratory directly underneath. There is also a small electro-analysis laboratory with provision for six electrical circuits.

The fourth floor houses organic chemistry immediately above the quantitative laboratory. There is a separate room for ether distillation work, with a shower in case of fire accident. The combustion room is off the laboratory and is particularly attractive, the furnaces being accessible on all sides and exhausted through a hood to take hot gases away. There are three lights under the hood.

There is a small water analysis laboratory. It is intended to use part of this for the bacteriological examination of water and milk. A fuel and gas analysis laboratory is provided, and it is intended to considerably extend the work in this direction. In addition there are lecture rooms, a well-equipped biology laboratory, and a stock room.

Institution of Chemical Engineers

Recent Elections

DURING the last quarter of 1930 the following have been elected to the Institution of Chemical Engineers:—

Members.—Andrew Baird, St. Rollox Works, Glasgow; Edward Victor Evans, F.I.C., South Metropolitan Gas Co., London; Francis Richard O'Shaughnessy, A.R.C.S., F.I.C., Birmingham.

Associate-Members.—William James Baker, Shanghai Gas Co.; Arthur Briggs, Yorkshire Electric Power Co., Ferrybridge; Kenneth Francis Carmichael, B.Sc., A.I.C., British Aluminium Co., Ltd., Burntisland; Richard Marston Deanesly, M.A., Shell Development Co., California (Transfer); William Hoghton Dearden, M.Sc., International Telephone and Telegraph Laboratories, London (Transfer); Thomas Pride Dee, B.Sc., A.I.C., British Celanese, Ltd., Spondon; Geoffrey James Greenfield, M.Sc., A.R.C.S., Thorncliffe Coal Distillation Co., Ltd., Sheffield; Ralph Samuel Harborne, M.Sc., A.I.C., Young Accumulator Co., Ltd., New Malden; Saral Jang Kohli, M.Sc., Ph.D., Maclagan Engineering College, Lahore (Transfer); Clarence Stott, B.Sc., A.I.C., South Metropolitan Gas Co., London; Robert Tollitt, McKechnie Brothers, Ltd., Widnes; Frank Trippier, B.Sc., A.I.C., Lever Brothers, Ltd., Port Sunlight; Stanley Tweedy, Consett Iron Co., Ltd., Consett; William Neville Warwick, Woodall-Duckham Cos., London.

Graduates.—Peter Walker Aitken, M.Sc., A.I.C., University College, London; Edward Cecil Benjamin Bott, B.Sc., A.I.C., Royal Arsenal, Woolwich; William Alexander Campbell, E. O'Keefe, Ltd., Dublin; Kenneth Lamphier Clark, Weston-super-Mare Gaslight Co.; Philip Arnold Farmer, B.Sc., Imperial College of Science and Technology, London; John Horne Gillies, General Electric Co., Philadelphia; Douglas Jepson, M.Sc., Castner-Kellner Alkali Co., Ltd., Weston Point; Shanker Rao Amrith Rao Saletore, B.Sc., University of Liverpool (Transfer); Jan Adolph Maria Van Moll, Metallic Glowlamp Works "Volt," Tilburg, Holland (Transfer); Reginald William Henry Wicking, Apex (British) Artificial Silk Co., Ltd., London; Edward McIvor Wilson, Mond Nickel Co., Ltd., London; Frederic Reginald Wright, B.Sc., Boulton and Paul, Ltd., Norwich.

Students.—Kenneth George Bodiley, B.Sc., Weston-super-Mare Gaslight Co.; Alistair Phillips Buchanan, B.Sc., Imperial College of Science and Technology, London; Ernest Victor Casburn, B.Sc., A.R.C.S., Imperial College of Science and Technology, London; William Sholedice Harvey, Chemical Department, Belfast Corporation Gas Works; Edward Henry Treffry Hoblyn, B.Sc., A.R.C.S., Imperial College of Science and Technology, London; John Henry Piddlesden, B.Sc., Imperial College of Science and Technology, London; John Leslie Wilson, Kendal Gas and Water Works; Gordon Graham Woodliffe, Kemball, Bishop and Co., Ltd., London.

Acid Trade in South Wales

A CIRCULAR has been sent to the shareholders of the Briton Ferry Chemical and Manure Co., Ltd., on the subject of a new arrangement for the marketing in South Wales of acid product as a by-product from zinc smelting. The present contract is shortly expiring, and in the recent negotiations with the zinc smelters, it is stated, the directors, in conjunction with the other South Wales acid makers, endeavoured to come to terms for an extension of the contract on similar lines to those ruling for the past few years, but efforts in this direction were frustrated through the zinc smelters insisting on direct dealings with the acid consumers. As an alternative preferable to such conditions, the board, in association with the other South Wales makers, had entered into a contract under which the company retires from the acid trade for a period of ten years, the consideration being a share of the proceeds arising from the sale of by-product acid to existing consumers with a guaranteed minimum sum.

The position will be dealt with in more detail at the general meeting of the company in March next.

The new conditions do not interfere with the fertiliser side of the company's business, and satisfactory arrangements have been made for the supply of acid required in the manufacture of superphosphate.

World Trade in Tungsten

A Decreased Demand

THE decline in world trade in tungsten, as evidenced by recent statistics from China, the greatest producer, and the United States, the largest consumer, is the subject of an article in *Commerce Reports*. The decline is due partly to increased stocks on hand, and, to a lesser extent, to the internal troubles in China. It appears to have started in the second half of 1929, and, so far as demand is indicated by imports into the United States, to have progressed more rapidly during that period than in 1930, but it is still continuing and the conditions apparently responsible for it are not likely to disappear soon. The great stimulus to sales of tungsten early in 1929, which brought total American imports for that year to more than double their previous post-war record, is to some extent responsible for the reaction. Expectation of higher consumer prices and of a restricted supply induced heavy buying. With stocks both in the United States and in China above normal, demand has eased off, and a recession of prices naturally has followed.

United States imports of tungsten ores from various sources of supply during the past three half-year periods are shown in the following table, which covers the tungsten content in imported ores and concentrates :—

Source	Jan.–June, 1929. Lb.	July-Dec., 1929. Lb.	Jan.-June, 1930. Lb.
China	2,007,230	1,654,223	1,277,451
Hong Kong	241,104	164,988	398,711
Australia	99,197	13,290	79,395
British Malaya	—	—	112,207
British India	—	23,296	5,778
Germany	21,864	106,023	214,336
United Kingdom	528,014	178,333	58,985
France	6,513	—	—
Mozambique	—	—	7,201
Canada	—	—	5,774
Mexico	—	3,050	61,668
Bolivia	311,111	677,033	165,276
Peru	116,480	—	496
Chile	7,075	—	—
Total	3,338,594	2,820,236	2,387,338

The United States thus usually obtains more than half its tungsten directly from China, but imports listed as from other sources are apt to be of Chinese origin also. For instance, the Hong Kong stocks are at least partly of Chinese tungsten ; in addition, China makes large tungsten shipments regularly to Germany and the United Kingdom, and both these countries, with very small tungsten reserves of their own, contribute largely to the American supply. It is evident, therefore, that a decline in American requirements is likely to affect Chinese sales to other countries, and it is not surprising that recent reports show a falling demand from European buyers. The lowered price in Chinese ports is an inevitable result of the dealers' discovery that their stocks are already high and sales declining. At the end of June, 1930, dealers in China reported the European demand particularly slack.

Tungsten exporters in China are quoted as believing that the low level has been reached by local prices, since Chinese production is now being restricted. Production in Kiangsi Province has been reduced to about 300 tons a month ; in Hunan it continues at about 70 tons a month, the usual rate. Local exporters have been informed that a pool of German, English and French buyers has been formed, chiefly for the purpose of preventing a sudden rise in prices on account of competitive buying, which caused a rapid advance of 300 per cent. in 1929.

One of the noticeable developments of recent years has been the appearance of Bolivia as a source of tungsten. In 1928 the United States had no record of tungsten imports from any South American country ; in 1929 about a million pounds were brought from Bolivia direct, and smaller amounts credited to neighbouring countries are generally believed to have originated in Bolivia. The first half of the present year, however, showed a decline in receipts from South America even more marked than that in other tungsten imports.

The larger number of sources of American imports recorded in 1930, when the total quantity was being reduced, is a matter of record rather than actual change in derivation. Late in 1929 and early last year receipts were shown from British Malaya and British India ; it is probable that the former represent Chinese tungsten shipped through Penang and the latter an accumulation of Burmese exports, which may have been actually shipped earlier than indicated. Since the Burmese tungsten ordinarily is a by-product of tin mining, the industry in Burma is naturally more strongly affected by the world price of tin than that of tungsten.

Sulphate of Ammonia Prices

To the Editor of THE CHEMICAL AGE.

SIR,—You published in your issue of December 20 extracts from the annual report of the Sulphate of Ammonia Federation, in which, *inter alia*, it is stated :—

(*a*) " The drop in the increase of consumption is obviously due to the depression in the agricultural industry, for, although as the report points out, in times of adversity farmers should use more nitrogen in order to increase their yields and lower their costs of production, they prefer instead to limit their purchases to the amount of their available cash " ;

and a few paragraphs further on :—

(*b*) " Toward the end of the fertiliser year 1929-30 a number of new synthetic plants came into operation and there was considerable pressure to sell in those markets which are capable of absorbing nitrogen in the summer months. If indiscriminate selling had been allowed to persist a general break in nitrogen prices would undoubtedly have occurred. The market was saved from this by the one year's agreement that was reached in the summer between the organised producing groups . . ."

Anything more unfair could hardly be imagined. The farmers are urged to use more sulphate of ammonia in order to increase their production and so lower costs, while the makers of sulphate of ammonia pat themselves on the back for having restricted production and so maintained prices at an artificially high level. There is no thought that the makers should increase production and so lower costs in order to provide the farmer with cheap fertiliser and thus help him in turn to reduce his costs.—Yours, etc., J. M. HATTRICK.

41, Eastcheap, London. December 30.

The Chemists' Charter

To the Editor of THE CHEMICAL AGE.

SIR,—I observe with great interest that the Institute of Chemistry is considering petitioning the Crown for certa n additions to its present charter. Perhaps the most important addition proposed is that which would allow members of t he Institute, and no one else, to call themselves " Charter ed Chemists." As one of the 5,700 members of the Institute, I appreciate the fact that as we are the only chartered body consisting of qualified chemists and qualified chemists only, we have a perfect right to this procedure. As one of the 10,000 British chemists, I appreciate that the Institute may conceivably be considered, in attempting to gain this privilege, to be doing something to the disadvantage of those chemists who are not members of the Institute.

On the one hand, I assume that almost every chemist will rejoice at this possibility of the introduction of a distinctive name which is approved and accepted in a Royal Charter, and which distinguishes chemists from pharmacists. On the other hand, he may fear that the creation of a register of chartered chemists may not be to the benefit of the whole profession, in that it may put general registration back a number of years, or perhaps render it impossible for all time. Those members of the Institute who believe in general registration will find it a little difficult to determine their policy. They will naturally wish to support the Institute in fighting any opposition which may come from the pharmacists. At the same time, if they have the interests of the whole profession at heart, while supporting the Institute, they may still wish to insist on the necessity for some general form of registration.

We are at one of the turning points in the history of our profession, and it is hoped that as many chemists as possible will find time to give the matter their thorough and sympathetic consideration. It may be possible, if thought is taken at once, to prevent this move on the part of the Institute increasing the segregation of chemists, and instead, to make it an opportunity for unifying the profession.—Yours, etc.,

Birmingham. January 5. A. W. KNAPP.

Trade Publications

Electrostatic Detarrer

Tar removal from coal gas by the Simon-Carves system of electrostatic precipitation is described in a booklet issued by the chemical plant department of Simon-Carves, Ltd., 20, Mount Street, Manchester. It is claimed that this system reduces the tar content to less than three-quarters of a grain per 100 c. ft. The principle employed in the detarrer is that of passing the tarry gas through an intense electric field set up between a central electrode at a high voltage and the walls of earthed tubes or plates. The tarry particles are charged, move across the field and deposit on the earthed surfaces on which the tar coalesces, leaving the gas quite clear. The plant has no proving parts whatever, and requires practically no supervision.

Acid-Resisting Metal

The wide variety of chemical vessels which is now being manufactured in Ironac acid-resisting metal by Haughton's Patent Metallic Packing Co., Ltd., 30, St. Mary-at-Hill, London, is illustrated in their latest catalogue. Ironac is a hard and homogeneous iron alloy, which does not easily oxidise and resists the action of sulphuric acid, nitric acid and other acids or acid mixtures, to a remarkable degree. It has in many cases been substituted with advantage for vessels and parts made of glass, earthenware or vulcanite, and is used instead of lead-lined vessels for sulphuric acid and liquors containing it.

X-Ray Goniometer Spectrograph

Adam Hilger, Ltd., 24, Rochester Place, London, have issued a booklet descriptive of Dr. Müller's improved X-ray Goniometer Spectrograph. Originally this was the first complete apparatus to be put on the market which was capable of undertaking most of the better known photographic methods of X-ray crystallography and spectrography. The latest model is capable of being used for any of the principal methods of X-ray spectrography and crystallography in which photographic recording is made use of, and in addition can be employed as an optical crystal goniometer.

A New Valve

A new bronze valve with a one-piece screw-over bonnet and slip-on stay-on disc holder, is described in a leaflet of Jenkins Brothers, Ltd., of 6, Great Queen Street, Kingsway, London. This is a new departure in bronze valve design. The one-piece bonnet construction provides ease in removal, and contributes unusual strength, which, it is claimed by the manufacturers, prevents springing or distortion, even though the bonnet is removed and replaced repeatedly. The valve throughout is heavily proportioned. The slip-on dischholder facilitates changing the disc.

Sulzer Technical Review

The No. 2 issue of the Sulzer Technical Review contains a description of large High Pressure Compressors as used for the manufacture of Nitrogen and Synthetic Ammonia, and is of particular interest on account of the high final pressure at which the machines operate, i.e. 15,650 lb. per sq. in. Other articles deal with Sulzer Diesel-Electric Locomotives, irrigation plant, and 3,200 b.h.p. steam turbine driven blowing plant for handling producer gas.

In the manufacture of food products, and in several branches of chemical industry, where it is important to avoid contamination due to metallic influences, glass-lined steel vessels are playing an important part. Tanks and baths of many designs and for many industries are listed and illustrated in the general catalogue of the Glass Lined Steel Tank Co., 19, Southampton Buildings, Chancery Lane, London.

ANDREWS syphon vortex hydraulic classifiers for consistent production of all ground and natural products are described in a leaflet of the Key Engineering Co., Ltd., 4, Queen Victoria Street, London. These classifiers give a finished product to any specification and are specially valuable in dealing with pigments and fillers. They have been designed to work in conjunction with existing mills.

"Uco" All-Mine cylinder irons are one of the latest developments of the Workington Iron and Steel Co., and have excellent properties as a base iron for the manufacture of castings subjected to heavy wear and high stresses. A pamphlet, descriptive of these irons and containing several sheets of graph paper, has been issued by the company.

Hadfields, Ltd., Hecla Works, Sheffield, have published a pamphlet describing their "Era 131" heat-resisting steel for high temperature boiler plants. While maintaining its strength at steam temperatures up to 1,100° F., this steel is amenable to manufacturing processes with practically the same facility as mild steel.

John Dugdill and Co., Ltd., whose new works are at Hazel Grove, near Stockport, have issued a folder and price list of works electric light fittings, together with an imposing list of chemical and other firms from whom they have recently had repeat orders.

The latest developments in the use of Catadyn silver for sterilising water both for domestic use and for large supplies are described in the new catalogue of the British Catadyn Co., Ltd., Sentinel House, Southampton Row, London.

METHODS of measuring corrosion, fitting, grooving and fractures in boilers, are described with illustrations in technical publication No. 27 of the Feed Water Specialists Co., Maxwell House, Liverpool.

The Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, has issued a leaflet describing the JCE Volume Meters suitable for compressed air, gas under pressure, steam, water and other liquids.

C.P. Rotary Converters are described, with illustrations of machinery recently supplied for large electrical corporations, in Specification A401, published by Crompton Parkinson, Ltd., Leeds.

British Industries Fair, 1931

Chemical Exhibitors at Olympia

THE section for chemicals at the British Industries Fair, Olympia, London, February 16 to 27, will occupy some 11,000 square feet on the ground floor of the Grand Hall. The following are among the exhibitors: Acetate Products Corporation, Ltd., London; Albright and Wilson, Ltd., Oldbury, near Birmingham; F. Allen and Sons (Poplar), Ltd., London; Association of British Chemical Manufacturers, Ltd., London; Bakelite, Ltd., London; Beetle Products Co., Ltd., Oldbury, Worcs.; A. Boake, Roberts and Co., Ltd., London; British Drug Houses, Ltd., London; British Industrial Solvents, Ltd., London; British Plastic Moulding Trade Association, London; W. J. Bush and Co., Ltd., London; County Chemical Co., Ltd., Birmingham; T. B. Ford, Ltd., London; Gas Light and Coke Co., London; General Chemical and Pharmaceutical Co., Ltd., London; Leonard Hill, Ltd., London; Hopkin and Williams, Ltd., London; Howards and Sons, Ltd., Ilford; Imperial Chemical Industries, Ltd., London; Imperial and International Communications, Ltd., London; Insulators, Ltd., London; Johnson and Sons (Manufacturing Chemists), Ltd., London; A. W. Kanis, London; Kelacoma, Ltd., Welwyn Garden City; Lawes Chemical Manure Co., Barking, Essex; Macleans, Ltd., London; May and Baker, Ltd., London; Morgan Bros. (Publishers), Ltd., London; Thomas Morson and Son, Ltd., London; G.B. Mouldings, Ltd., London; National Titanium Pigments, Ltd., London; Plastics Press, Ltd., London; Reeves and Sons, Ltd., London; Francis Shaw and Co., Ltd., Bradford, Manchester; South Metropolitan Gas Co., London; Spencer, Chapman and Messel, Ltd., London; St. Albans Moulding Co., Ltd., St. Albans, Herts; Thos. Tyrer and Co., Ltd., London; United Ebonite Manufacturings, Ltd., Chadwell Heath, Essex; Whiffen and Sons, Ltd., London; Williams (Hounslow), Ltd., Hounslow.

"The Papers of Lord Rendel"

A REMARKABLY cordial welcome has been given by the leading reviewers in the principal journals of the country to a work of great political and personal interest, "The Personal Papers of Lord Rendel," edited by Mr. F. E. Hamer (Ernest Benn, Ltd., 320 pp., 18s.), and published on January 2. The work recovers with quickening effect the atmosphere of Victorian political life, and the wealth of anecdote and incident is, as the *Morning Post* reviewer says, "absolutely embarrassing." The Rendel "Papers" is distinctly the most widely discussed book of the New Year.

British Chemical Trade with China

Leading Position in Soda Ash and Fertilisers

BRITAIN dominates the soda ash and chemical fertiliser trade with China, and her dyestuffs trade is increasing, according to a review of economic conditions in China in 1929–30 by the Acting Commercial Counsellor at Shanghai (Published for the Department of Overseas Trade by H.M. Stationery Office, 2s. 6d. net).

Imports of soda ash during 1929 amounted to 934,530 piculs, as against 845,861 piculs in 1928, and although there was a falling off in imports of caustic soda, the figures for those of British manufacture for the first eight months of 1930 show an increase of nearly 30 per cent. in the case of soda ash and of 12 per cent. in the case of caustic soda. The trade may be said to be practically entirely in British hands, and although the fall in exchange has necessitated an increase in prices, demand has remained steady. There are signs that attempts are to be made to introduce Russian soda ash into the market, which may make it necessary to reduce prices in order to defeat this competition.

In chemical fertilisers business was very satisfactory. The bulk of the trade is in sulphate of ammonia, imports of which in 1929 amounted to 1,857,359 piculs, as compared with 1,754,831 piculs in 1928. By far the largest proportion of imports are of British manufacture, and the figures for the first eight months of this year show an increase of nearly 60 per cent. as compared with the corresponding period of last year. Germany stands next in the field, and, while American imports have declined, there was a slight import of Dutch and Japanese manufactures.

There is a trend towards better and faster aniline dyes which the Chinese public are being trained to appreciate, thanks to a widespread publicity campaign on the part of the dyestuff manufacturers, but trade during the first eight months of 1930 remained dull. While German products still hold a dominating position, figures indicate that imports of British, American and French manufacturers are increasing.

Modern Scientific Education

THE Science Masters' Association, which has a membership of some 1,700 and is open to all Science Masters in secondary schools, has been holding its annual meeting at Birmingham University during the present week. Lectures were delivered on Wednesday, Thursday and Friday, the speakers including the Bishop of Birmingham (Dr. E. W. Barnes), whose subject was "A Finite World"; Professor W. N. Haworth, "An Insight into Complex Molecular Structures"; Professor Nash, "The Work of the Physicist and Chemist in the Petroleum Industry"; and Professor F. W. Burstall, "The Science Education of the Boy up to Eighteen Years of Age."

In his presidential address, Sir Charles Robertson referrred to the excessive and premature specialisation that marked modern science education, and proposed two remedies. The first was a conference of science masters in the schools and university authorities to put the "scholarship business" on a new, rational and really educational basis. Secondly, he invited the Science Masters' Association to go direct to the Royal Society and get that body to lay down the fundamentals of science education.

The Late Lord Melchett

THE following acknowledgment of messages of sympathy has been issued from 35, Lowndes Square, S.W.1:—

"Violet Lady Melchett and her family are deeply grateful for all the messages of sympathy and appreciation and thank you most sincerely."

The Hon. Henry Mond's message to the workers is published in the following terms in the I.C.I. magazine:—

"I wish to express on behalf of my mother, my sisters, and myself our deep appreciation of the messages of sympathy we have received from all the workers of I.C.I. It is very helpful to us to realise at this time the affection and esteem in which he was held by all ranks. I feel we must all help to carry on his ideas and ideals. His last words to me were, 'It's all right.'"

Long Service with Chemical Firms

Appreciation from Colleagues and Employers

PRESENTATIONS were recently made to Mr. W. H. Harrison to mark the completion of fifty years' service with Thomas Morson and Son, Ltd., chemical manufacturers, Summerfield Chemical Works, Ponders End. In the presence of several directors and about one hundred workpeople, Mr. A. R. Morson (chairman) handed Mr. Harrison a portable wireless set and a cheque for £50 from the directors, while, on behalf of the employees, Miss P. Bowden (who has 51 years' service with the firm to her credit) presented him with a chiming clock. In a brief speech Mr. Morson said he thought he was justified in asserting that they were the largest manufacturers of potassium iodide in the country, and it was in the department where that chemical was made that Mr. Harrison had worked. A general impression was prevalent that a chemical factory was not a healthy place in which to work, but with a sufficient exercise of precaution, there was no more danger than was encountered in any other trade—in fact, just because care was taken, there was less danger.

On his retirement after 27 years' service with Nobel's Explosives Co., Ltd., (Imperial Chemical Industries) Mr. Edwin Isherwood, superintendent of the electrical department at Ardeer Factory, Stevenston, was presented with two easy chairs from his colleagues.

Tributes to the admirable qualities of Mr. E. George Smith were recently paid by the staff of the Briton Ferry Chemical and Manure Co., Ltd., who presented him with a gold watch at a tea given in his honour. Mr. Smith, after 44 years' service with the company, has relinquished his position as manager to take over the South Wales sales managership for the National Sulphuric Acid Association.

The long service record of Mr. Thomas Leighton with the Marley Hill Coke and Chemical Works was recently the subject of comment in a northern newspaper. Mr. Leighton, who is 82, worked for 64 years with this firm, 50 years in an official capacity, and two of his sons now have posts there.

Improved Anti-Knock Motor Fuel

Effects of Higher Temperature

MOTOR fuel of improved anti-knock quality results from increasing either time or temperature in cracking crude oil, even at atmospheric pressure, according to conclusions reported to the American Chemical Society by J. C. Geniesse and Raymond Reuter, of the Atlantic Refining Co., Philadelphia.

"The gradual increase in the use of high-compression pressure motors in automobiles to obtain more power from a given engine has necessitated the development of fuels having a greater tendency to resist detonation," says the report. "Higher quality fuels of this type are being produced from selected crudes which are inherently good, by cracking and by blending, such as the addition of benzene or tetraethyl lead. Of these three methods the use of selected crudes and the use of blending agents are limited by availability, and are therefore not within the refiner's control. Cracking, on the other hand, is strictly within the refiner's control, and can be applied to produce the required stock.

"The yields of gasoline, gas, and coke, and the properties of these products, indicate that the main effect of temperature is to increase the rate of reaction. That is, it is possible to obtain very nearly the same results with either short-time high-temperature or long-time low-temperature experiments. An increase of 17° C. halves the time necessary to produce the same results. By raising the temperature of cracking, fuels may be produced with less tendency to detonate."

Thermometric Lag

A BOOKLET on Thermometric Lag and the relative seriousness of the errors it may occasion has just been issued by Negretti and Zambra. Consideration is given to the rate at which heat is brought to or taken away from the thermometer bulb by the medium in which it is immersed, the rate at which heat is transferred from the outer surface of the bulb to its interior, and the heat capacity of the bulb and the substance within it. Practical tests are given for determining the lag coefficient, and methods of making use of the lag coefficient in lag problems.

From Week to Week

SIR ERNEST RUTHERFORD, O.M., F.R.S., who received a peerage in the New Year Honours List, is taking the title of Lord Rutherford.

MR. E. W. BEATTY, president of the Canadian Pacific Railway, has been elected a director of the International Co. of Canada, Ltd., in succession to the late Lord Melchett.

A NEW GLUE FACTORY has just been opened at the beginning of the present year at Reval in Estland, and, according to *Die Chimische Industrie*, will concentrate chiefly on the export of the better qualities of glues to other Baltic States and England.

A DAILY CALENDAR for 1931, with a full calendar for the month and for the succeeding month on each page, has been sent out by A. Borsig, G.m.b.H., Berlin-Tegel, through their agents Leistikow, Allison and Co., 18/19, Southampton Buildings, Chancery Lane, London.

THE SHELL UNION CORPORATION and the Standard Oil Co. of California, it is reported from Chicago, have jointly purchased, for £5,000,000, the control of the Universal Oil Products Co., organised by the late Mr. J. Ogden Armour to exploit the Dubbs oil cracking process.

OWING TO ILLNESS, Mr. C. Featherstone Hammond will be unable to read his paper on "The Concentration of Phosphoric Acid Solutions by Means of the Submerged Flame," before the Institution of Chemical Engineers on January 14, and the meeting arranged for that date will not be held.

THE PROVISIONAL 45 per cent. limitation of production agreed to by the Japanese association of chloride of lime producers is to be continued for a further period. Production in the Japanese artificial silk industry is being curtailed 15 per cent. in January and 10 per cent. in February and March.

THE PONTARDULAIS CHEMICAL WORKS have definitely closed down. They had not been fully manned for some time and many of the old employees had been absorbed elsewhere, but a number of men will now be thrown out of work. The works were established 43 years ago and were the largest single chamber sulphuric acid works in Wales.

THE HURTER MEMORIAL LECTURE will be delivered before the Liverpool section of the Society of Chemical Industry, by Professor G. T. Morgan, Director of Chemical Research, Department of Scientific and Industrial Research, in the Chemistry Lecture Theatre, the University of Liverpool, on Friday next. His subject will be "Organic Synthesis Facilitated by Pressure." An informal dinner will follow at the University Club, Mount Pleasant.

RECENT WILLS include Mr. James Morris, of Birkenhead, for many years a director of Morris and Co., Chester, colour manufacturers (net personalty £9,563), £17,398. Alderman John Edward Purvis, of Corpus Christi College, Cambridge, University Lecturer in Chemistry since 1909 and Mayor of the Town in 1928-29 (net personalty, £15,247) £15,354. Mr. John Connel King, Glasgow, shipowner and chemical manufacturer, personal estate in Great Britain £30,392.

MR. STANLEY G. IRVING, Commercial Secretary to H.M. Embassy at Rio de Janeiro, is now in this country on an official visit, and will be available at the offices of the Department during the periods February 2 to 6 and 23 to 27, to interview manufacturers and merchants interested in the export of British goods to Brazil. He will also visit a number of industrial centres in the provinces. Firms desiring interviews should apply to the Comptroller-General, Department of Overseas Trade, 35, Old Queen Street, London, quoting the reference 2111/1/30.

DR. HERBERT LEVINSTEIN, last year's President of the Society of Chemical Industry, and the present chairman of Council, has been awarded the Society's Medal, awarded not more frequently than once every two years for "conspicuous services to applied chemistry by research, discovery, invention or improvement." Dr. Levinstein, who is the eighteenth recipient of the Medal, did much valuable work during the war on the Chemical Warfare Committee and for over twenty years he has been closely associated with the British dyestuffs industry. His father, Mr. Ivan Levinstein, also a past president of the Society of Chemical Industry, was the founder of Levinstein's, Ltd., which in 1918 was amalgamated with British Dyes, Ltd., to form the British Dyestuffs Corporation.

THE ORDINARY MEETING of the Optical Society for session 1930-31, which was announced for January 15, has been postponed.

THE NAME of the Hardy Patent Pick Co., Ltd., Sheffield, makers of tools and machinery for mining, gas works, etc., has now been altered to Hardypick, Ltd.

MR. HIRSCHHORN, chairman of African Explosives and Industries and of the Cape Explosive Works, has resigned his seat on the board of De Beers Consolidated Mines, Ltd.

CHARLES CLIFFORD AND SON, LTD., Birmingham, report an increasing demand for sheet pewter (Britannia metal) for the manufacture of art metal ware, of which they have forwarded as a sample, a "Seacliff" ash-tray, made from their own special alloy.

THE EXPANSION programme of Courtaulds (Canada), Ltd., of Cornwall, Ontario, is going forward rapidly. A new factory is being erected and by next July is expected to employ several hundred additional operatives and to increase capacity by about 30 per cent. to four million pounds of rayon per year.

AT THE ANNUAL MEETING of the Institute of Chemistry, to be held on March 2, the Council proposes to submit a recommendation that the entrance fee to the Fellowship for Associates, who have paid an entrance fee on admission to the Associateship, be reduced from five guineas to three guineas.

NO FURTHER CHANGE in address is contemplated by the Newcastle-upon-Tyne Zinc Oxide Co., Ltd., as might have been inferred from our note in last week's issue. The company has been operating at Birtley since February of last year, and is now increasing its plant capacity there to cope with expanded business.

MR. SIDNEY ROGERSON, who has for the past two years been in charge of the Press department of the Federation of British Industries, relinquishes his appointment on January 1, to organise and take charge of a similar department at Imperial Chemical Industries, Ltd. His address is Room 503, Imperial Chemical House, Millbank.

A SPECIAL COMMITTEE appointed by Dundee Town Council has recommended that the Council should enter into a lease and profit-sharing arrangement with William Briggs and Sons, Ltd., chemical manufacturers, Dundee, and hand over the Corporation Tar Distillation Works to the firm to be run by them. The Council has had the works under consideration since 1924, when it was reported that they were being run at a loss.

ACHEMA VII, the exhibition of chemical apparatus to be held in 1933, has, we are informed by the organising body, the Dechema, Deutsche Gesellschaft für chemisches Apparatewesen E.V., already attracted notifications of their intention to take part from 134 firms, this in spite of the fact that the venue of the exhibition has not yet been determined. Of these firms 63 have already reserved stands, so that about 2,000 sq. metres of exhibition floor space have now been ordered in advance.

BRITISH CELANESE, LTD., announce that they have commenced an action against Cellulose Acetate Silk Co., Ltd., Non-Inflammable Film Co., Ltd., Acetate Products Corporation, Ltd., and the directors of the Cellulose Acetate Silk Co., Ltd., claiming injunctions restraining the defendants from enticing the employees of British Celanese, Ltd., to leave their employ and enter that of the defendants, and also from obtaining and utilising the trade secrets of British Celanese, Ltd., or any confidential information of any kind relating to their business, plant, or processes. British Celanese, Ltd., are at the same time claiming damages for conspiracy, as well as general damages.

AN ORDINARY SCIENTIFIC MEETING of the Chemical Society will be held at Burlington House, London, on Thursday next, when the following papers will be read: "Salt-forming characteristics of doubly and singly linked elements of the oxygen group." Part I. "The carbonyl groups in benzoaldehyde and acetophenone," by J. W. Baker; and Part II. "The nitration of benzoaldehyde and acetophenone in sulphuric acid solution," by J. W. Baker and W. G. Moffitt; "10-Chloro-5 : 10-dihydrophenarsazine and its derivatives. Part XIV. Chloro-derivatives," by L. A. Elson and C. S. Gibson, and "The essential oil of Backhousia Augustifolia. Part III. The constitutions of angustione and dehydroangustione," by R. S. Cahn, C. S. Gibson, A. R. Penfold, and J. L. Simonsen.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

337,415. FERTILISERS. A. Holz, 18, Sherman Place, Irvington, N.J., U.S.A., and T. Van D. Berdell, 39, Broadway, New York. Application date, July 30, 1929.

Calcium chloride is treated with sulphuric acid to produce potassium bi-sulphate, which is then treated with ammonia to obtain potassium and ammonium sulphates. The liberated hydrochloric acid gas is passed into a suspension of rock phosphate to form calcium chloride and phosphoric acid. Calcium hydroxide is added to precipitate dicalcium phosphate, which is separated and dried at 100° C. and then mixed with the potassium and ammonium sulphates to obtain a mixed fertiliser. If an excess of sulphuric acid is used, the proportion of potassium and ammonium sulphates obtained on addition of ammonia may be varied.

337,434. HYDROCARBONS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 30, 1929.

Hydrocarbons are passed through heat regenerators heated to temperatures up to 1100° C. to obtain other hydrocarbons containing double bonds in the molecule. The regenerators may be constructed of firebricks impregnated with copper salts, or of bricks made from fireclay and silicon, and the heating is effected by means of oxygen-containing gases which burn off the previously deposited carbon. The gases treated may be obtained from bituminous coal or from the destructive hydrogenation of carbonaceous materials. Lower temperatures are employed for the production of olefines than for the pro production of aromatic hydrocarbons. An example is given.

337,460. SYNTHETIC RUBBER. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 2, 1929.

Diolefines are polymerised by means of sodium contained in a small perforated container within the reaction vessel. Diolefine first entering the small container is rapidly polymerised and the polymerisate and alkali metal are then forced by excess pressure into the reaction vessel. The perforated container may be of glass or metal.

337,559. FILTERING LIQUIDS. Aluminium-Industrie Akt.-Ges., Neuhausen, Switzerland. International Convention date, January 17, 1929.

The effect of alkaline liquids on filtering cloths is avoided by precipitating manganese oxide in the cloth, *e.g.*, by saturating the cloth with potassium permanganate and then converting the salt into oxide. Alternatively, the material to be filtered may-be mixed with substances containing manganese.

337,563. DYE INTERMEDIATES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 10, 1929.

Compounds of the general formula

$$HO\text{-}aryl\text{-}NHCO\text{-}aryl\text{-}NO_2$$

are reduced in alkaline solution by means of glucose, zinc dust or sodium sulphide. The compounds obtained show great affinity for vegetable fibres and combine with diazo compounds. Examples are given of compounds obtained by reducing m^1-nitrobenzoyl-*m*-aminophenol, p^1-nitrobenzoyl-*m*-aminophenol, m^1-nitrobenzoyl-*p*-aminophenol, 6-(4^1-methoxy-3^1-nitrobenzoylamino)—3-hydroxy-1-methyl-benzene, 2-(4^1-nitrobenzoylamino)-1-methyl-4-hydroxybenzene.

337,566. ACETONE. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. Application date, October 10, 1929.

Isopropyl alcohol is dehydrogenated below 350° C. in the presence of copper, managanese peroxide, barium peroxide, metals of the platinum group, zinc oxide, cadmium oxide, uranium oxide, blue tungsten oxide, manganese oxide, vanadium pentoxide, magnesium oxide, beryllium oxide or zirconium oxide. About 1 per cent. of zinc oxide, thorium oxide, sodium carbonate, cerium oxide or zirconium oxide may be added. The catalyst is regenerated by treating with steam and reducing.

337,577. DYES. J. R. Geigy Soc.-Anon., 51, Riehenring, Basle, Switzerland. International Convention date, October 15, 1928.

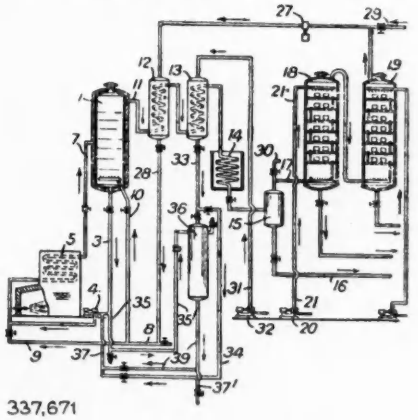
A diazotised aryl- or aralkyl-ether of 2-aminophenol or a substitution product is combined with an N-arylsulpho-1-amino-8-naphthol-disulphonic acid to obtain dyes which give clear red shades on wool and silk, fast to light and to acid or alkaline fulling. Examples include the dyestuffs *o*-aminodiphenylether → N-*p*-toluenesulpho-H-acid and 4-chloro-2-aminophenyl-benzylether → N-benzenesulpho-H-acid.

337,609. GLYCOLLIC ACID ESTERS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 8, 1929.

Anhydrous alkali metal or alkaline earth metal salts of chloracetic acid are heated above 100° C. with aliphatic alcohols in the absence of an esterifying agent. If the alcohol boils below 100° C., pressure must be employed.

337,671. DESTRUCTIVE HYDROGENATION. Standard Oil Development Co., Linden, N.J., U.S.A. Assignees of J. M. Jennings, 1202, Park Boulevard, Baton Rouge, La., U.S.A. International Convention date, December 21, 1928.

Crude oil, tar, cracked residues or suspensions of coal in oils are destructively hydrogenated by solid catalysts such as chromium or molybdenum oxides, at a temperature of 800° to 970° F. and pressure above 25 atmospheres. Coking is prevented by keeping the ratio of asphalt to catalyst about 0·5. The material is treated in a vessel 1, and part of it is continuously withdrawn through pipe 3, pump 4, and heating coil 5, and then returned to the vessel 1. Hydrogen is supplied through pipe 10. Gas is drawn off through pipe 11 to heat exchangers 12, 13, condenser 14 and separator 15. The condensate is withdrawn by pipe 16 and gas by pipe 17 to a washing tower 18 supplied with oil through pipe 21, Sulphuretted hydrogen is then removed by sodium hydrate or carbonate in a tower 19. The gas then passes through pump 27 to preheater 12, pipe 28 and feed pipe 8. Fresh oil is supplied by pump 32 through pipe 31 to preheater 13 and thence to pipe 3. Fresh catalyst is supplied from a vessel 36.



337,671

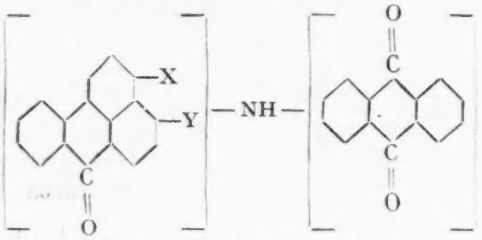
337,680. CATALYTIC APPARATUS. C. Toniolo and Azogeno Soc. Anon. per la Fabricazione Dell Ammoniaca Sintetica e Prodotti Derivati, Vado Ligure, Savona, Italy. International Convention date, July 25, 1929.

Catalysers consisting of a number of layers of platinum or other metal gauze are formed of coarser mesh near the inlet for the reacting gas, where they are more subject to attack by the reacting gas.

D

337,741. VAT DYESTUFFS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 4, 1929.

Condensation products of the general formula



in which the anthraquinonyl radicle is attached by the—NH—group to the benzanthronyl radicle in a position other than those containing the substituents X and Y, and in which both X and Y are hydrogen atoms, or X a 2- or Bzl-benzanthronyl radicle or a etherified hydroxy group when Y is hydrogen, or Y is a 2- or Bzl-benzanthronyl radicle when X is hydrogen, one further anthraquinonyl radicle being attached to the benzanthronyl radicle by a—NH—group, are treated with alkaline condensing agents, according to 306,874. (See THE CHEMICAL AGE, Vol. XX, p. 339.) It is now found that valuable vat dyestuffs are obtained by treating with alkaline condensing agents those anthraquinonyl-aminobenzanthrones which contain several anthraquinonylamino radicles, of which one is in the Bzl-position. These dyestuffs may be subsequently treated with acid condensing agents. Examples are given.

337,774. WETTING, CLEANSING, EMULSIFYING AND DISPERSING AGENTS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 27, 1929. Addition to 306,116.

Specification No. 306,116 describes the condensation of amines which contain at least two organic radicles containing hydroxyl groups, with organic carboxylic acids or sulphonic acids, or sulphonated carboxylic acids, all the components being free from chromophorous groups. The products are esters or amides, and in this invention they are converted into salts by treatment with acids, before or after treatment with alkylating agents. Protective colloids or organic solvents may be added.

337,792. FINELY DIVIDED ZINC OXIDE. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 7, 1929.

A zinc salt solution having a concentration less than 1·5 normal is caused to flow in slight excess into sodium carbonate solution of maximum concentration of 1·5 normal. The precipitate is washed, finely ground and sifted, and then calcined below red heat.

337,808. HYDROXY-DI- OR TRI-ARYLMETHANE COMPOUNDS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 6, 1929.

Specifications Nos. 336,893–4, 335,547, 333,561 (see THE CHEMICAL AGE, Vol. XXIII, pp. 169, 510, 358), 337,832 (see below) describe hydroxy-di- and tri-arylmethane compounds and their sulphonic acids in which the sulphonic acid groups are present in the aldehydic nucleus. In this invention, these products are treated with sulphonating agents in the presence of organic solvents. The products include isomeric sulphonic acids or polysulphonic acids containing the sulphonic groups in the phenol residues. The products are employed for moth-proofing wool, fur, etc.

337,822. TREATMENT OF LYES FROM CHLORINATED BURNT PYRITES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 8, 1929.

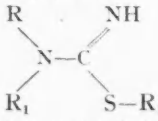
The lyes are treated first with iron to precipitate copper, and the iron is then oxidised by treating with an alkaline earth metal chlorate, *e.g.*, chlorate lye obtained by treating milk of lime with chlorine. Quicklime is added to precipitate the iron, which is filtered off with the calcium sulphate, and the filtrate is worked up for the recovery of zinc and cobalt.

337,821. 2- AND 3- HYDROXYCARBAZOLES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 8, 1929.

These compounds are obtained in good yield by distilling a tetra-hydrogenated 2- or 3- alkylhydroxy-carbazole over lead oxide at 500°–600° C. whereby the alkyl group is split off. An example is given.

337,823. MOTH-PROOFING WOOL, FUR, HAIR, ETC. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 8, 1929.

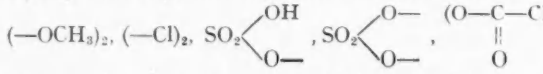
A moth-proofing agent for wool, fur, hair, etc., consists of a derivative of thiourea of the formula



in which R represents alkyl, cyclo-alkyl, aralkyl or aryl, one R_1 represents hydrogen, and the other R_1 an acid residue.

337,832. HYDROXY-DI- OR TRI-ARYLMETHANE COMPOUNDS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 9, 1929. Addition to 316,900.

Specification No. 316,900 describes the condensation of one molecular proportion of an aldehyde, except aromatic oxyaldehydes and their sulphonic, carboxylic, or sulphocarboxylic acids in the presence of an acid condensing agent with two molecular proportions of a *p*-halogenated phenolic compound containing a free *o*-position to a hydroxy group, and which may be substituted in the nucleus by one or more indifferent substituents such as halogen atoms or alkyl groups. In this invention, the same compounds are obtained by using aldehyde derivatives in which the carbonyl derivatives are replaced by alkyloxy—or inorganic or organic acid residues such as

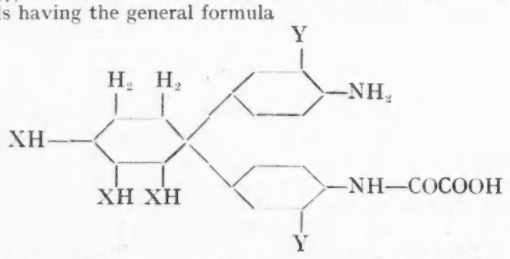


337,847. OXIDES OF NITROGEN. N. Caro, 97, Hohenzollerndamm, Berlin-Dahlem, Germany, and A. R. Frank, 138, Kurfürstendamm, Berlin-Halensee, Germany. Application date, August 13, 1929.

All the oxides of nitrogen, produced by oxidation of ammonia, are converted into highly concentrated nitric acid or liquid nitrogen tetroxide without using sulphuric acid to bind an excess of water and without distilling dilute nitric acid. Part of the water is first withdrawn without allowing any considerable oxidation, and the residual water is separated as nitric acid during or after oxidation by means of oxygen. The nitrogen oxides are then liquefied.

337,860. MONO-OXAMIC ACIDS OF 4 : 4¹-DIAMINO-DIARYL-CYCLOHEXANE COMPOUNDS AND DYESTUFFS DERIVED THEREFROM. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 20, 1929.

The 4 : 4¹-diamino-diaryl-1 : 1¹-cyclohexane compounds described in 313,421 (see THE CHEMICAL AGE, Vol. XXI, p. 57) are treated with oxalic acid to obtain mono-oxamic acids having the general formula



in which one X represents hydrogen or methyl, and the other X's hydrogen, and the Y's represent hydrogen, halogen, methyl, or alkoxy groups. These acids may be diazotized, and the diazo compounds combined with azo components. The dyestuffs obtained may be again diazotized and combined with azo components. Examples are given.

Specifications Accepted with Date of Application

317,493. Iron alloys, Process of removing the last traces of oxygen from. A. Glazunov. August 18, 1928.

318,599. Electrolytic production of alloys of calcium or strontium with lead. Metallges. Akt.-Ges. September 6, 1928.

318,999. Increasing the resistance to corrosion of aluminium alloys. Durener Metallwerke Akt.-Ges. September 14, 1928.

319,285. Cellulose nitro-acetate, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 19, 1928.

339,937. Barbituric acid derivatives, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) August 14, 1929.

339,946. Steel having good machining properties, Manufacture of. F. Borggraefe. December 22, 1928.

339,958. Condensation products, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 12, 1929.

339,962. Products containing nitrogen, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) September 11, 1929.

340,004. Polymerisation of unsaturated organic compounds. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 12, 1929.

340,007. Non-dyeing thio derivatives of phenols, Process for the manufacture of. I.G. Farbenindustrie Akt.-Ges. and A. Thauss. August 19, 1929. Addition to 173,313 and 298,280.

340,008. Polymerisation of diolefines. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 19, 1929.

340,009. Dyestuffs of the tartrazine series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). August 19, 1929.

340,011. Derivatives of higher fatty acids, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). September 11, 1929.

340,012. Derivatives of higher fatty acids containing sulphur, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) September 11, 1929.

340,016. Catalytic desulphurisation of gases. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 16, 1929.

340,030. Cracking of hydrocarbon oils. J. E. Pollak. (*Petroleum Conversion Corporation.*) September 19, 1929.

340,050. Hydrogen or gases containing hydrogen from methane and similar hydrocarbons or gases containing these hydrocarbons, Manufacture of. D. Tyrer and Imperial Chemical Industries, Ltd. October 3, 1929.

340,082. Red lead, Production of. H. Erzinger and Chemische Fabrik Schonenwerd H. Erzinger Akt.-Ges. October 30, 1929.

340,098. Absorption of olefines in sulphuric acid. Standard Oil Development Co. November 15, 1928.

340,114. Condensing ordinary urea or its derivatives with formaldehyde or its polymerides. Fabriques de Produits de Chimie Organique de Laire, J. Malet, and R. Armenault. December 6, 1928.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Baron, H., and Siemens und Halske Akt.-Ges. Production of alloys of beryllium with heavy base metals. 38,795. December 23.

—— Crucibles for electrolysis of fused electrolytes. 38,796. December 23.

Barrett Co. Distillation of tar. 38,507. December 22. (United States, December 28, 1929.)

Bernhauer, K. Production of organic compounds by biochemical action. 109. January 1. (Germany, January 3, 1930.)

Bloxam, A. G., and Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 38,719. December 23.

Budgen, N. F., and W. Mills, Ltd. Manufacture of aluminium castings. 39,145. December 30.

Caro, N., and Frank, A. R. Fixation of ammonia-nitrogen. 39,171. December 30.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 38,607. December 22.

—— Manufacture of filter press plates. 38,789. December 23.

—— Manufacture of monoacyl-diamino-acridines. 39,177. December 30.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of etching agents. 239. January 2.

Chemical and Metallurgical Corporation, Ltd. Fractional distillation. 39,276. December 31.

Collett, E. Manufacture of nitric acid from nitrous gases. 39,060. December 29.

Consortium für Elektrochemische Industries Ges. Manufacture of combinations of polyvinyl-esters and fatty acids. 39,307. December 31. (Germany, December 31, 1929.)

Courtaulds, Ltd. Dyeing with vat colouring matters. 38,742. December 23.

Deutsche Hydrierwerke Akt.-Ges. Manufacture of sulphonic acids. 110. January 1. (Germany, September 29, 1930.)

Duckham and Co., Ltd., A. Apparatus for cooling and cleaning liquids. 35. January 1.

Du Pont de Nemours and Co., E.I., and Imperial Chemical Industries, Ltd. Manufacture of concentrated nitric acid. 38,520. December 22.

Fairweather, D. A. W., Imperial Chemical Industries, Ltd., and Thomson, R. F. Dyestuffs. 39,348. December 31.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Process for obtaining hormones. 38,551. December 22.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Process of producing staining effects on paper, etc. 199. January 2.

—— Manufacture of azo dyestuffs. 39,183. December 30.

Hamer, F. M., and Ilford, Ltd. Preparation of substances containing oxidisied pyridine ring of pyridone type. 38,958. December 24.

—— Preparation of ψ-cyanines comprising a single ring nucleus. 38,959. December 24.

—— Preparation of ψ-cyanines containing β-naphtaquinoline nuclei. 38,960. December 24.

Hodgkin, J. E., and Schindelmeiser, J. Production of aldols and glycols. 183. January 2.

—— Production of compounds analogous to erythroles, etc. 184. January 2.

—— Production of ureides. 185. January 2.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Carrying out pyrogenic reactions with hydrocarbons. 38,537. December 22.

—— Manufacture of resinous thermoplastic polymerisation products. 38,538. December 22.

—— Manufacture of metals from metal carbonyls. 38,886. December 24.

—— Electrodes for accumulators. 38,887. December 24.

—— Catalytic manufacture of hydrocyanic acid. 38,888. December 24.

—— Desulphurisation of gases. 38,889. December 24.

—— Manufacture of vinyl ethers. 38,890. December 24.

—— Manufacture of monoacyl-diamino-acridines. 39,177. December 30.

—— Manufacture of resins, etc. 39,291. December 31.

—— Manufacture of resinous compositions, etc. 39,292. December 31.

—— Fuel compositions. 39,293. December 31.

—— Manufacture of acetylene. 39,294. December 31.

—— Manufacture of conversion products of rubber. 39,295. December 31.

—— Manufacture of coloured masses, and solutions thereof. 39,296. December 31.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for manufacture of liquid products from tars, etc. 190. January 2.

I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products of benzanthrone series. 38,555. December 22.

—— Manufacture of vat dyestuffs. 38,556. December 22.

—— Manufacture of hydroxy-alkyl-polyvinyl compounds. 38,715. December 23. (Germany, December 27, 1929.)

—— Manufacture of solutions of silk fibroin. 38,716. December 23. (Germany, December 23, 1929.)

—— Preparation of subtractive multicolour pictures. 38,892 December 24. (Germany, December 24, 1929.)

—— Manufacture of mixed esters of cellulose, etc. 39,055. December 29. (Germany, December 27, 1929.)

—— Manufacture of fatty acid esters of cellulose, etc. 39,304. December 31. (Germany, December 31, 1929.)

I.G. Farbenindustrie Akt.-Ges. and Mond, A. L. Production of formic acid. 38,878. December 24.

Imperial Chemical Industries, Ltd. Vulcanisation of rubber, etc. 38,875. December 24.

—— Manufacture of substances for use as mordants. 39,050. December 29.

Imperial Chemical Industries, Ltd. Pressure-reducing devices for liquids. 202. January 2.

Kali-Forschungs-Anstalt Ges. Production of potassium nitrate. 38,541. December 22. (Germany, April 28.)

Mann, H. C., Wilton, T. O., and Wilton, N. Calcining calcium sulphite, etc. 38,916. December 24.

Mentzel, A. Sodium cyanide. 39,081. December 29. (Germany, January 3.)

Perkin, A. G. Dyestuffs. 39,349. December 31.

Salerni, P. M. Distillation, etc., of carbonaceous materials. 38,731. December 23.

Titanium Pigment Co., Inc. Manufacture of titanium pigments. 39,364. December 31. (United States, January 14.)

Usines de Melle. Manufacture of mesityl oxide. 38,702. December 23. (France, December 23, 1929.)

—— Manufacture of diacetone alcohol. 39,152. December 30. (France, January 4.)

Whittaker, C. M., and Wilcock, C. C. Dyeing with vat colouring matters. 38,742. December 23.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4½d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3¾d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included: £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¼d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 7½d. per lb. Crude 60's 1s. 2d to 1s. 6d. per gall. August/December.

ACID CRESYLIC 99/100.—2s. to 2s. 3d. per gall. B.P., 4s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 3d. to 2s. 5d. per gall. Pale, 94%, 1s. 9d. to 1s. 10d. per gall. 98%, 1s. 9d. to 1s. 11d. Dark, 1s. 5d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6¼d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 7½d. to 8½d. per gall.; Standard Motor, 1s. 3d. to 1s. 4d. per gall.; 90%, 1s. 4½d. to 1s. 5½d. per gall.; Pure, 1s. 7½d. to 1s. 8½d. per gall. (The above prices were operative from October 21 last).

TOLUOLE.—90%, 1s. 8d. to 1s. 10d. per gall. Pure, 1s. 9½d. to 2s. per gall.

XYLOL.—1s. 4½d. to 1s 9d. per gall. Pure, 1s. 7½d. to 1s. 11d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 5½d. to 6¾d. per gall. Home, 4d. per gall. d/d. Middle oil, 4½d. to 5d. per gall, Standard specification, 3d. to 4d. per gall. Light gravity, 1½d. to 1¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 8¾d. per gall. Solvent, 90/160, 1s. 2½d. to 1s. 3d. per gall. Solvent, 95/160, 1s. 3½d. to 1s. 5d. per gall. Solvent 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £3 to £5 per ton. Whizzed, £4 to £5 per ton. Hot-pressed, £8 per ton.

NAPHTHALENE.—Crystals, £10 per ton. Purified Crystals, £11 11s. per ton. Flaked, £11 per ton.

PITCH.—Medium soft, 44s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 6d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 4d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. to £8 per ton. Grey, £14 to £15 per ton. Liquor, 9d. per gall.

ACETONE.—£74 to £75 per ton.

CHARCOAL.—£6 5s. to £8 3s. per ton, according to grade and locality.

IRON LIQUOR.—10d. to 1s. 2d. per gall.

RED LIQUOR.—8d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—2s. 11d. to 3s. 1d. per gall. Solvent, 4s. per gall.

WOOD TAR.—£4 5s. per ton.

BROWN SUGAR OF LEAD.—£37 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£6 to £7 10s. per ton, according to quality.

CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4¾d. to 5½d. per lb.; Dark, 4½d. to 5d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
VERMILION, PALE OR DEEP.—6s. 6d.–7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£38 5s. per ton, for ½ ton lots, £37 5s. for 1 ton, smaller quantities £39 5s., delivered, barrels free.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 1½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 0½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—7s. 6d. per lb.
BISMUTH CITRATE.—7s. 6d. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts', 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 4d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s. 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—90s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; fo r28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 11d. per lb., for 28-lb. lots. Green, 2s. 6d per lb., list price. U.S.P., 2s. 9d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. 3d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. 3d. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARAFORMALDEHYDE.—1s. 8d. per lb.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—88s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1 cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. per lb. for 28-lb.. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—85s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 7s. 3d. to 8s. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—6s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 4d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—10s. 9d. per lb.
LINALOL, EX BOIS DE ROSE.—6s. per lb. Ex Shui Oil, 6s. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—8s. 6d. per lb. Ex Shui Oil, 8s. 6d. per lb.
MUSK KETONE.—30s. per lb.
MUSK XYLOL.—6s. 3d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—42s. per lb.
SAFROL—1s. 3d. per lb.

(*Essential Oils on page* 39.)

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, January 8, 1931.

THE market continues to be restricted mainly due to extended holidays and the stock-taking period, although there are signs that this is ending and probably the next week will show an improvement in the demand. The market has shown very little change in prices, steadiness being an outstanding feature at the present time.

General Chemicals

ACETONE.—The market is settling down at the lower levels of £60 to £65 per ton.

ACID ACETIC.—Prices are firm at £36 5s. to £38 5s. for 80% technical, and £37 5s. to £39 5s. for pure 80%, with indications that the demand is being maintained.

ACID CITRIC.—A small business only is passing and the market remains easy at about 1s. 2d. to 1s. 2½d. per lb., less 5%.

ACID FORMIC.—The market is maintained at about £38 per ton for the 85% quality with a fairly satisfactory demand.

ACID LACTIC.—Unchanged at £41 to £42 for the 50% by weight, pale quality, and there is a steady demand.

ACID OXALIC.—The market is firm at £30 7s. 6d. to £32 per ton, according to quantity, and there is a fairly satisfactory call.

ACID TARTARIC.—Steady at 1s. to 1s. 1d. per lb., less 5%, with rather more inquiry.

ALUMINA SULPHATE.—Unchanged at £7 15s. to £8 5s. per ton for the 17/18% iron free quality, and there is a fairly good demand.

ARSENIC.—Continues to be scarce with the market firm at £19 to £19 10s. per ton.

CREAM OF TARTAR.—Unchanged at 88s. per cwt., ex warehouse London, at which there is a regular business passing.

COPPER SULPHATE.—Steady at £22 to £22 10s. per ton, less 5%, free on rails London, with the demand rather slow.

FORMALDEHYDE.—A little easier at about £31 per ton, ex warehouse London, with a good demand.

LEAD ACETATE.—Unchanged at £34 15s. per ton for brown and £35 15s. per ton for white, and there is a small trade passing.

LEAD NITRATE.—Unchanged at £29 10s. per ton.

LITHOPONE.—Steady at £18 to £22 per ton, according to grade and quantity.

POTASSIUM BICHROMATE.—The market is firm at 4¼d. per lb., with the usual discounts for contracts, and there is a steady demand.

POTASSIUM CARBONATE.—About £28 per ton for 96/98%, arsenic free quality.

PERMANGANATE OF POTASH NEEDLE CRYSTALS B.P.—Firm at 5½d. per lb.

SODA BICHROMATE.—The market is very firm at 3¼d. per lb. nett, with the usual discounts for contracts, and there is a steady call mainly on contract account.

SODA CHLORATE.—Firm at about £25 per ton, with the demand increasing.

SODIUM HYPOSULPHITE.—Commercial crystals £8 10s. per ton. Photographic crystals £14 5s. per ton, and the demand is a little better.

SODIUM SULPHIDE.—Unchanged at £10 5s. to £11 5s. per ton for solid, with broken material £1 per ton extra, carriage paid.

TARTAR EMETIC.—In small request at about 11d. per lb.

ZINC SULPHATE.—Quiet at £11 to £11 10s. per ton.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—There has been a moderate demand for prompt shipment at current prices but little interest has been taken in forward bookings.—*Home.*—A few orders have been placed by large buyers for stock against spring requirements but otherwise there has been little demand.

Nitrate of Soda.—Scale prices are being maintained but the market continues quiet.

Coal Tar Products

The coal tar product market is very quiet, and there does not appear to be any revival of business in general. Inquiries are very few, but prices remain unchanged.

MOTOR BENZOL.—Remains at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Unchanged at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Unchanged at about 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Remains at 1s. 8d. per gallon for the 91/100% quality, and at 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Quoted at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Offered at 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast Port.

Scottish Coal Tar Products

A LITTLE more interest is being shown in the better grades of tar-acids, but so far few orders have been placed. Other products continue dull.

Cresylic Acid.—While stocks remain high there are more inquiries particularly for the higher boiling fractions. Pales, 99/100%, 1s. 7d. to 1s. 8d. per gallon; pale, 97/99%, 1s.6d. to 1s. 7d. per gallon; dark, 97/99%, 1s. 5d. to 1s. 6d. per gallon; high boiling acid, 1s. 7d. to 1s. 9d. per gallon; all f.o.r. naked.

Carbolic Sixties.—There are no orders being placed and value is nominal at about 1s. 8d. to 1s. 10d. per gallon for best qualities.

Creosote Oil.—The results of several tenders are awaited with interest, and meantime prices are unchanged. Specification oil, 2½d. to 2⅝d. per gallon; gas works ordinary, 3d. to 3⅛d. per gallon; washed oil, 3d. to 3¼d. per gallon; all in bulk quantities ex works.

Coal Tar Pitch.—New business is scarce and values are easy at 42s. 6d. to 45s. per ton f.a.s. Glasgow for export, and about 45s. per ton ex works for home trade.

Blast Furnace Pitch.—Remains quiet with controlled prices at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Makers' quotations range from 2⅞d. to 3⅛d. per gallon according to quantity and delivery.

Blast Furnace Tar.—Dull at 2¾d. per gallon ex works.

Crude Naphtha.—Production is low and value is steady at 4d. to 4¼d. per gallon.

Water White Products.—Stocks are accumulating and few orders are being placed. Motor benzole is 1s. 4d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2d. to 1s. 3d. per gallon; 90/190 heavy solvent, 1s. to 1s. 0½d. per gallon; all in buyers' tanks ex makers' works.

Latest Oil Prices

LONDON, January 7.—LINSEED OIL closed firm at 2s. 6d. decline to 5s. advance. Spot, ex mill, £20 10s.; January, £17 7s. 6d.; January-April and May-August, £17 5s.; September-December, £17 15s., naked. RAPE OIL was quiet. Crude, extracted, £29; technical refined, £30 10s., naked, ex wharf. COTTON OIL was steady. Egyptian crude, £21 10s.; refined common edible, £25 10s.; deodorized, £27 10s., naked, ex mill. TURPENTINE was firm and a further 3d. per cwt. higher. American, spot, 35s.; February-April, 35s. 9d.; Russian, spot, 32s. 6d.

HULL.—LINSEED OIL.—Spot, £18 5s.; January, £17 15s.; January-April, £17 5s.; May-August, £17; September-December, £17 7s. 6d.; East Indian, spot, unquoted; Baltic, spot, £25 10s. per ton, naked. COTTON OIL.—Egyptian, crude, spot, £19; edible, refined, spot, £22; technical, spot, £22; deodorized, £24 per ton, naked. CASTOR OIL.—Spot, 30s.; firsts, 34s.; seconds, 32s. per ton. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £23 per ton, naked. GROUNDNUT OIL.—Crushed, extracted, spot, £23 10s.; deodorized, spot, £27 10s. SOYA OIL.—Extracted and crushed, spot, £23; deodorized, spot, £26 10s. per ton. RAPE OIL.—Crushed extracted, spot, £28 10s.; refined, spot, £30 10s. per ton. COD OIL.—18s. 6d. per cwt. TURPENTINE unchanged at 37s. 3d. per cwt.

South Wales By-Products

THE Welsh coal dispute has had a serious, adverse effect upon South Wales by-product activities. Business in practically all products is slow and unsatisfactory, and it is unlikely that there will be any immediate improvement. Pitch continues to have a small, unsatisfactory market, but here, at least, the coal trouble is sure to have a brightening effect by sending up the demand for patent fuel. Pitch stocks are in excess of demands, and up to the time of writing quotations are unchanged. Solvent naphtha has only a small call, while heavy naphtha has practically no market. Values are unchanged. There is a small demand for road tar round about 13s. per 40-gallon barrel delivered. Refined tars have a fair call, with quotations unchanged for coke oven and gasworks tar. Patent fuel and coke exports remain unsatisfactory. Patent fuel prices, for export, are: 21s. 6d., ex-ship Cardiff; 20s., ex-ship Swansea and Newport. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 26s. to 30s.; furnace, 17s. 6d. to 21s. 6d.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, January 6, 1931.

INQUIRIES in the Scottish heavy chemical market have been few and far between, chemical works in Scotland generally being closed for the New Year holidays.

Industrial Chemicals

ACETONE.—B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered free Great Britain in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3⅛d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £31 per ton, ex wharf. On offer for shipment from China at about £29 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £21 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £22 5s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or at £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99⅜/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid, buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £9 18s. per ton, carriage paid, buyer's sidings, minimum six-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices, 60s. per ton, ex works; 65s. 0d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

(*Continued from page 37.*)

Prices of Essential Oils

BERGAMOT OIL.—8s. 9d. per lb.
BOURBON GERANIUM OIL.—15s. per lb
CASSIA OIL, 80/85%.—4s. 3d. per lb.
CINNAMON OIL LEAF.—6s. 3d. per oz.
CITRONELLA OIL.—Java, 2s. 4d. per lb., c.i.f.
CLOVE OIL, 90/92%.—8s. 3d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.
LEMON OIL.—4s. 3d. per lb.
PEPPERMINT OIL.—Japanese, 4s. 6d. per lb.

World Supplies of Sulphur

Resources of Italy and the United States

ENORMOUS quantities of sulphur exist in the earth's crust. It has been estimated that sulphur constitutes ·06 to 1 per cent., but a large part of world reserves cannot be estimated with precision. Estimates of world reserves vary from 56,000,000 to 121,000,000 metric tons. It is apparent that there is little danger of an immediate scarcity in the supply of sulphur.

The two countries with the largest reserves are Italy and the United States. Italy is estimated, on a most conservative basis, to have reserves of 25,500,000 metric tons, and on a more liberal basis its reserves are estimated at 84,200,000 tons. The Texas deposits probably contain in excess of 40,000,000 tons of sulphur, without allowance for recent discoveries. Many other occurrences in the United States are not included in these estimates, such as those of Culberson County, Tex., where an immense tonnage is reported to exist. Some of them probably have commercial possibilities. Chile is reported to have, in the provinces of Tacna and Antofagasta, sulphur reserves amounting to 5,530,000 metric tons, with grades ranging from 70 to 96 per cent. Spain's reserves, as estimated, range from 525,000 to 1,750,000 metric tons. The grades run from 15 to 30 per cent. Japan probably has several million tons of 50 per cent. sulphur ore.

General information regarding the sulphur situation is contained in the United States Bureau of Mines Information Circular 6329, by Robert H. Ridgway.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, January 8, 1931.

For all practical purposes business in chemicals on the Manchester market is now back to where it was before the break for Christmas, although at the moment new transactions tend to be on a restricted scale. The cotton mill trouble in Lancashire does not make for confidence, and if it develops, as there is a very distinct danger of its doing, the reaction on chemical trade operations on this centre will be severe. So far as prices are concerned, these for the most part are steady, and on this account alone there seems to be little reason why buyers should not venture forward with some degree of confidence.

Heavy Chemicals

Prussiate of soda meets with some inquiry, and prices in this section maintain their firmness at from 4¾d. to 5¼d. per lb., according to quantity. The demand for sulphide of sodium this week has been on a modest scale, with current offers of the 60/65 per cent. concentrated solid quality in the region of £10 10s. per ton, and of the commercial kind at about £9. Caustic soda prices are firm on a contract basis of from £12 15s. to £14 per ton, according to grade, and fair deliveries of this material are being made. A quiet trade is going through in the case of phosphate of soda, with the dibasic sort at round £10 per ton. Offers of alkali are on the steady basis of £6 per ton, and a moderate inquiry is reported; bicarbonate of soda is also well held at round £10 10s. per ton, a fair amount of buying interest being shown. Not a great deal of business is being done at the moment in hyposulphite of soda, values of which are steady at about £9 5s. per ton for the commercial grade and from £15 to £15 10s. for the photographic quality. Inquiry for chlorate of soda is on moderate lines, with prices fully maintained at from £26 to £27 per ton. There has been a quiet demand about this week in the case of bichromate of soda, values being steady on the basis of 3½d. per lb., less 1 to 2½ per cent. Saltcake values are well held at up to £3 5s. per ton.

Not a great deal of business is offering in permanganate of potash yet, but quotations are unchanged on the week at round 5½d. per lb. for the B.P. quality, and 5¼d. for the commercial. A moderate demand is reported for bichromate of potash at the basis price of 4¼d. per lb., less discounts of 1 to 2½ per cent. Carbonate of potash is attracting some attention and values of this material keep up at round £25 per ton. In the case of caustic potash, business is on moderate lines, but quotations seem fairly steady at the moment at from £28 10s. to £29 per ton. With regard to yellow prussiate of potash a fair amount of buying interest is being shown, with prices ranging from 6¾d. to 7¼d. per lb., according to quantity. Chlorate of potash remains quiet but steady at round £27 10s. per ton.

Growing firmness seems to be in evidence in the case of arsenic, and current values of white powdered, Cornish makes, range from £19 per ton at the mines. There is a moderate demand about for sulphate of copper and prices have shown very little movement, round £21 per ton, f.o.b., still being quoted. Demand for the acetates of lime is of limited extent and some easiness is being displayed, the grey quality being no better than about £14 per ton and the brown at £7 to £7 10s. The lead products, also, are not too strong, the brown quality ranging from £33 10s. to £34 per ton, and the white at up to £35.

Acids and Tar Products

A quiet trade is passing in tartaric acid and at round 11½d. per lb. no further easiness has developed since last report. Citric acid, also has been maintained at about 1s. 2¾d. per lb. There is only a moderate business reported in the oxalic acid section, but prices are steady at up to £1 12s. per cwt., ex store. Acetic acid meets with a fair demand at round £37 per ton for the 80 per cent. commercial kind, and from £47 to £51 per ton for the technical glacial.

By-product sales in most instances are of limited extent just now, though quotations have not altered much, pitch selling at from 40s. to 42s. 6d. per ton, f.o.b., and creosote oil at from 3¼d. to 4¼d. per gallon, naked, at works. Carbolic acid is slow and easy at up to 5½d. per lb., f.o.b., for crystals, and round 1s. 4d. per gallon, naked, for crude 60's. Solvent naphtha is still quoted at about 1s. 2½d. per gallon.

Company News

Chemical Bank and Trust Co., New York.—The total assets, as shown by a statement of condition at December 31, 1930, amount to $478,635,356.

Canada Cement Co.—For the year to November 30, 1930, the profit amounted to $3,132,150, after making provision of $8,055,344 for depreciation of capital assets.

"L and N." Coal Distillation.—The report for the fifteen months ended June 30, 1930, states that after providing for salaries, office and general administration expenses £8,486, interest £2,932, and directors' fees (unpaid) £2,043, the loss for the period was £13,395, to which is added balance debit brought forward £8,600, making total debit balance to be carried forward £21,994.

San Sebastian Nitrate Co.—The trading loss on nitrate for the year ended June 30, 1930, amounts to £8,984 (against a loss of £1,922 in the previous period of eighteen months). After adding taxes, expenses, depreciation, interest, etc., less profit on iodine, transfer fees, transfer of taxes reserve not required, the loss is £16,701. Adding balance brought forward, £15,116, there remains a debit on profit and loss account of £31,817.

British Cement Products and Finance Co., Ltd.—The report for the year to November 16, 1930, shows that income amounted to £55,882, against which is charged expenses, etc., £6,181, interest £45,302, directors' fees £559, net loss on realisation of investments £6,034, and special investigation expenses £1,050, leaving a loss for the year of £2,974. This added to the debit balance of £768,578 brought in makes a deficit to be carried forward of £771,552.

Solidol Chemical Co.—The net profit for the period of thirteen months to September 30 last amounted to £276 (against £6,832 for the initial period from May 7, 1928, to August 31, 1929). After crediting £3,250 brought in and deducting preference dividend paid on October 1, 1929, there is a surplus of £2,634 to be carried forward. The balance sheet shows preliminary expenses outstanding £15,000 and advertising and development account, less £6,666 taken from reserve, £30,109.

Scottish Agricultural Industries.—The directors regret that it is impossible to recommend a dividend on the ordinary or deferred shares for the year ended June 30, 1930. The report states that the balance brought forward was £1,793, to which is added dividends received from sub-companies £26,338, balance transferred from preference dividend reserve account £8,250, making £36,381. The directors recommend a dividend on 6 per cent. cumulative preference shares for the year ended June 30, 1930, subject to deduction of tax £34,489, leaving to be carried forward £1,892.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to January 17, 1931.

Durafur.

517,722. Class 1. Chemical substances used in manufactures. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. November 13, 1930. To be Associated with No. 514,719 (2,741) and others.

517,723. Class 4. Raw, or partly prepared, vegetable, animal and mineral substances used in manufactures. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. November 13, 1930. To be Associated with No. 514,720 (2,736) and others.

Autocol.

516,279. Class 1. Anti-freezing mixture, being a chemical substance. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. September 23, 1930.

Recent Tariff Changes

Chemical Products Affected

CHILE.—By a decree issued on December 10, and to come into force 60 days after that date, the duties on a large number of tariff items have been increased. Duties on chemicals and allied products have been affected as follows: Increased by about 11 per cent.—aluminium sulphate and mineral or organic compounds of iodine. Increased by about 16 per cent.—raw or boiled linseed oil. Increased from 20 to 25 per cent.—hydrochloric, lactic, nitric and tartaric acids, potash alum, aqueous and anhydrous ammonia, silver nitrate, soda crystals, and sulphite, bisulphite and hydrosulphite of soda, iodine, starch, common glue, dextrin, dry starch glue, gluten glue, red iron oxide, yellow and green colours, ochres, etc. (not including coal tar dyes), and colours containing up to 10 per cent. of coal tar dyes. Increased from 30 to 35 per cent.—lime, boric acid, pyroligneous acid, impure sulphuric acid, lump, ground or sublimated sulphur, impure copper sulphate, colourless distilled glycerine, magnesium sulphate (Epsom salts), Prussian blue, varnishes, paints, and soaps.

HUNGARY.—A number of increases in import duties are now in force including the following: Chloride of lime now 10 gold korona per 100 kilogs. (formerly 8); heavy coal tar oil of the benzol series, 3·50 (formerly 2·50); phenolic resins, 60 (30); metagon colours for leather factories, 60 (45); amyl acetate, 300 (240); sulphide of carbon, 15 (10); chemically prepared tissues for packing, 280 (200); porcelain articles for technical use, except electro-technical, 24 (20). Increases are also imposed in the duties on special apparatus, including especially filters and filter presses, for sugar factories and breweries.

ITALY.—A Decree Law, to operate for ten years, has been passed for the encouragement of the leucite industry. Exemption from Customs duty is accorded in respect of: Machines, apparatus and parts thereof, and materials of all kinds, including highly concentrated nitric acid, imported for use in the leucite industry for the production of aluminium oxide, potash fertilisers and potassium salts, provided that it is not possible to use machines and material of national (Italian) origin.

A Royal Decree now lays down provisions for the control of products containing methyl alcohol or other non-ethyl products. A copy may be inspected by traders interested at the offices of the Department of Overseas Trade, 35, Old Queen Street, London.

MEXICO.—A number of decreases in import duties as the result of a Decree, effective on December 15 last. The duty on nitroglycerine is now 0·04 pesos per kilog. (formerly 0·12); borate of soda or borax, 0·05 (0·08); white cyanides of potash and soda, 0·01 (0·03); calcium carbide, 0·03 (0·07); gas masks and protectors of all kinds for workmen, 0·03 (0·10). Black alkaline cyanide in flasks are now 0·50 pesos per 100 kilogs. instead of 1·30, and cellulose pulp in undyed sheets and pressed into cakes, 1·25 pesos per 100 kilogs. instead of 1·50.

NYASALAND.—The duty on soap of all kinds is now 7s. per cwt. or 17 per cent. *ad val.*, whichever is greater. Insecticides and disinfectants have been omitted from the free list and are now presumably dutiable at 17 per cent. *ad val.*

POLAND.—A modification of the Customs tariff involving very considerable increases in the duties on chemicals have been in force since December 7. Natural salts of potasth, concentrated chloride of potassium and potassium sulphate, now pay 6 zloty per 100 kilogs (formerly 1.50); crude acetate of lime, 25 (formerly 13); hypochlorite of lime and hypochlorite of sodium, 24 (formerly 18.20); acetic acid, 150 (formerly 104); acetone, 140 (formerly 91); dinitrochlorbenzol, dinitrophenol, 400 (formerly 137.60); diphenylamine, 350 (formerly 137.60); diaminotoluidine, 500 (formerly 137.60); benzidine, 500 (formerly 206.40); amido naphthol disulphonic acid, 1, 8, 3, 6 (H acid), 700 zloty (formerly 240.80).

YUGOSLAVIA.—The import duty on refined paraffin wax has been reduced from thirty to fifteen gold dinars per 100 kilogs.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Declaration of Solvency

[Registered under Section 230 of the Companies Act, 1929. It must be understood that (a) a company which has filed a Declaration of Solvency may be proposing to wind up with a view to reconstruction, and (b) it does not necessarily follow that a company which has filed such declaration will actually pass a resolution to wind up.]

ZOCUS PAINT CO., LTD. Declaration of solvency filed January 1, 1931.

London Gazette, &c.

Winding-Up Petition

CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE CO., LTD. (W.U.P., 3/1/31.) A petition for the winding-up of this company by the High Court of Justice was, on January 2, presented by His Majesty's Attorney-General, and is to be heard at the Royal Courts of Justice Strand, London, on January 19.

Company Winding Up

SABULITE (GREAT BRITAIN), LTD. (C.W.U., 3/1/31.) Statutory meetings at 33, Carey Street, Lincoln's Inn, London, W.C.2, January 13; creditors at 2.30 p.m.; and contributories at 3 p.m.

Companies Winding Up Voluntarily

STANDARD AMMONIA CO., LTD. (C.W.U.V., 3/1/31.) By special resolution, December 29. M. C. Spencer, of 3, Frederick's Place, Old Jewry, E.C., appointed as liquidator. Members' winding-up; all creditors will be paid in full.

ANGLO-AMERICAN OIL AND SHIPPING CO., LTD. (C.W.U.V., 3/1/31.) By special resolution, January 1, for amalgamation with the Eagle Oil Transport Co., Ltd. C. H. M. C. Wilson, of 16, Finsbury Circus, London, E.C.2, appointed as liquidator.

New Companies Registered

ROBT. INGHAM CLARK AND CO. (SCOTLAND), LTD. Abbey House, Victoria Street, London, S.W.1. Registered as a "private" company on December 31. Nominal capital, £2,000, in £1 shares. To acquire the business carried on by a company of the same name, including the business of Dowie and Smith, incorporated therein, and to carry on the business of oil, paint, pigment, varnish and colour manufacturers, merchants and importers, manufacturers of and dealers in wallpapers, and chemical, industrial and other preparations, etc. Directors: R. H. Ingham Clark, A. E. Gibson, H. Smith, J. M. Christie.

HENRY EVERY AND CO., LTD. Registered December 30, in Edinburgh. Nominal capital £5,000, in £1 shares. Chemical, colour and varnish manufacturers, merchants, brokers and agents, etc. Director: W. G. C. Every.

L. A. MITCHELL, LTD. Registered January 1. Nominal capital £2,000, in £1 shares. To acquire the business of a consulting and chemical engineer now carried on by L. A. Mitchell at Harvester House, 37, Peter Street, Manchester, as L. A. Mitchell. Director: L. A. Mitchell, 56, South Drive, Chorlton, Manchester.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

EGYPT.—The Surveyor General of Egypt is calling for tenders, to be presented in Giza (Mudiriya) by March 17, for the supply of sensitive paper and developing and acid fixing powder. (Tender No. 2-4/25—1931/32.) Ref. No. B.X. 6968.

GREECE.—A commission agent in Salonica desires to obtain the representation of British manufacturers of artificial leather and linoleum. (Ref. No. 13.)

SYRIA.—An agency from British manufacturers of artificial silk and pharmaceutical preparations is sought by a Beirut agent. (Ref. No. 20.)